

DOCUMENT TYPE DEFINITIONS FOR
SERIAL PUBLICATIONS
PART I: ARTICLE DTD 4.1.0

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The figures in appendix H were prepared especially for this documentation by Coen Hofmann, Alfred Smit and Sebastian Rahtz. The present document replaces “Documentation type definitions for serial publications” of 2 December 1996, by N.A.F.M. Poppelier, H. van der Togt and F.K. Veldmeijer. This earlier document is therefore obsolete.

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Chapter 1

Introduction

This document describes the article DTD version 4.1.0. The index DTD version 1.1.0 and the glossary DTD version 1.1.0 are described in separate documents.

The purpose of this document is not to give a detailed explanation of the Standard Generalized Markup Language (SGML) or to explain the basics of writing a Document Type Definition (DTD). The main purpose is to provide a readable description of the Elsevier Science DTDs for journals.

However, on the understanding that there are those who would like to comment, but do not feel the need for an in-depth tutorial on the subject, the following section should put this document into context.

1.1 SGML – what and why?

1.1.1 What

An explanation of what SGML is can be found in [1]. We will summarize briefly here. In order to separate structure and presentation one applies the concept of generic markup: generic codes (or tags) are placed around most – or all – elements in a document. These elements could be a paragraph, a title, an abstract etc. The tags usually indicate the structure of the document. They do not indicate the style or format of the document, such as fonts, column widths etc. For each different style a style sheet is required to translate the logical structure into a presentation on paper, for example. The set of tags and their mutual relations comprise the ‘generic markup language’.

1.1.2 Why

SGML is a natural evolution of generic markup: it formalizes the structure and representation of the document, by combining the notion of generic markup with the observation that the logical structure of a document can be expressed in a tree-like structure. ‘SGML has the flexibility to define an infinite set of generic markup languages. [...] An SGML markup language defines the possible hierarchical structures of documents in [a] class’ [1].

By using SGML to structure documents, they can be exchanged between many parties. Furthermore, the tags can remain constant and device-independent, since they define generic markup and do not drive any specific application. The SGML tags can readily be converted to typesetting codes for paper printing, or to field codes for database creation, or to any other codes for numerous applications.

Chapter 2

The document type definition

The purpose of a DTD is to define the structure of a type or class of documents. It describes and names the tags that will identify the different elements in a document and their relationships. In other words, a DTD is more than a list of tags: it is a grammar of a particular class of documents. In particular, the purpose of the Elsevier Science DTDs for journals is to cover all publication items published in journals produced by Elsevier Science. It is important therefore that these DTDs identify every type of structure within such documents. The reason for this is that pieces of information, e.g. an address, that need to be extracted from a document at a later stage for a certain product or service, must be tagged in the document.

2.1 Objectives

SGML plays an essential role in computer-aided production in the process of scientific publishing. A DTD defines the tagging of documents: it describes which elements an article must contain, which it may optionally contain, whether elements may occur only once or may be repeated, and how elements are tagged. The DTD described here will serve as a standard for tagging of publication items published in journals. The use of a fully functional, standard DTD is essential for the achievement of the objectives of Elsevier Science.

The DTD described in this report defines the structure of the typical article published in research journals or proceedings. Other possible constituents of a journal issue, such as errata, editorials, book reviews and review articles, are now also included in the structure that is defined by the article DTD. Related DTDs exist for subject indexes and glossaries.

To enhance readability of this documentation of the DTDs, an index of all elements and attributes is added at the end. For further reading on SGML, please refer to the bibliography.

2.2 How to read this description

It is assumed that the reader has a basic knowledge of SGML, at least to the level that the reader knows that

- SGML tags are used for marking text structure;
- a document type definition (DTD) is used for defining text structure;
- presentation rules, for example in the form of a style sheet, are used to translate the structure of a document into some form of presentation, for example into instructions for a typesetting system.

For further information please refer to [1, 2].

2.3 Article structure versus text structure

This documentation is split in two major parts: a part on the structure of the article-like document types that occur in journals and a part on text structure. The first is concerned with article specific elements, such as author, title, section and paragraph, bibliography and appendix (chapter 3). These elements may have deeper structure, which is discussed in the chapter on text structure (chapter 4).

2.4 Embedded and sequential structure

In any DTD structure is defined in terms of sequence and embedding. For example an article consists of the elements copyright information, document header, document topic, front matter, body matter and back matter, which must appear in this order. Each of these structural elements may be further subdivided, and these subdivisions subdivided again, and so on. For example: a constituent part of the front matter is the author group, a constituent part of author group is author name, a constituent part of author name is first name, and so on. In other words: first name is embedded in author, author in author group and author group in front matter.

In the chapters on document and text structure, the sequential order and the embedded structure of the DTDs are reflected in the level of the section numbers. Elements in a DTD at the same level, such as front matter, body matter and back matter are assigned section numbers at the same level, e.g. 3.1, 3.2 and 3.3. Embedded elements are assigned section numbers at a deeper level, e.g. 3.4, 3.4.10, 3.4.10.1.

In some cases where article elements are at the same level of embedding, the order of the elements may vary. When this is the case, it is explicitly stated, for example in the author element, where first name and surname can appear in any order (see section 3.4.5.2).

2.5 Optional, mandatory and absent tags

For each element, opening and closing tags are given. It is also specified whether the tags are mandatory or optional. If a tag is mandatory, it must be present in the document for every instance of that particular element. This does not mean that the element has to be present in a document.

In cases where an element at one level follows an element at the same level, the closing tag will often be optional. This is because the new opening tag automatically implies a closing tag for the previous element, e.g. the front matter ends where the body of the article begins. In such cases the opening tags are mandatory, whereas the closing tag is optional.

In cases where it is not obvious where an element finishes, a closing tag would be mandatory.

In some cases, the closing tag does not exist at all, and the element is called an ‘empty’ element. This would occur, for instance, where tags do not enclose content (text), but are merely used for establishing a cross-reference.

2.6 Optional, mandatory and repeatable elements

For each element, a DTD specifies whether the element is an optional or mandatory part of the document and whether it may be repeated in its ‘parent’ element, i.e. the immediately surrounding element.

An element that is optional, may be absent or present in its parent element. An example is the dedication element in the front matter (see section 3.4).

An element that is mandatory, must be present in its parent element: if it is not, then its parent element is not valid according to the proposed DTD. An example is front matter (see 3.4): this is considered to be an essential element of the typical scientific article.

Note that in cases where a mandatory element has a parent element that is optional, the element itself is only mandatory if its parent element is present. An example is the element country in the parent element affiliation: country is mandatory in affiliation (see 3.4.5.5), but affiliation is an optional constituent of an author group (see 3.4.5). Therefore, if affiliation is present, country must be present, but affiliation need not be present in an article.

A DTD also specifies if an element can appear more than once within its parent element, irrespective of whether it is optional or mandatory.

Examples of elements that can be repeated are:

- affiliation in author group (section 3.4.5);
- author in author group (section 3.4.5);
- paragraph in body matter (section 3.6).

Examples of elements that cannot be repeated are:

- front matter in article (chapter 3);
- dedication in front matter (section 3.4).

In most cases this is obvious: there can be more than one author, but there cannot be more than one front matter.

It should be noted that when a DTD specifies that an element cannot be repeated within its parent element, this does not necessarily mean that the element cannot occur elsewhere in the document. This could occur if the parent element is repeatable. For instance, whereas the sub-title element within the parent element 'article title' cannot be repeated, article title itself can. Consequently, sub-titles can occur more than once in an article, but each one of them must correspond to an article title, and per article title not more than one sub-title is allowed.

2.7 Attributes and cross-reference

Attributes in SGML are used for specifying properties of the document elements, in addition to the content of those elements. For each element, attributes are listed if applicable. For each attribute, the full name is listed, the proposed code is given and it is specified whether the attribute is optional or mandatory for this particular element. Where considered relevant, the meaning of the attribute is explained briefly.

Attributes are also used to create links for cross-referencing. By using the attribute `id` together with a unique name for its value, an element can be identified for future referencing in the text. By using a special cross-referencing element, `cross-ref`, with the same unique identifier `refid`, the connection can be made.

An example may help to clarify this. Assuming there is a bibliographic reference (the target) the author wishes to refer to in the text, the reference would be 'tagged' as follows (in this example indentation, line breaks and spacing are used for clarity only – in actual documents these will be absent).

```
<bib id="ref2">
  <no>[2]
  <bb>
    <contribution>
      <authors>
        <author>
          <fnm>E.<snm>van Herwijnen
        <title>Practical SGML
      <host>
        <book>
          <edition>2nd (revised) edition
          <date>1994
          <publisher>
            <name>Kluwer Academic Publishers
            <location>Dordrecht
```

where `ref2` is a unique identifier for that particular reference (for more information please read section 4.5). Now, in the body of the article, the author can use the cross-referencing element (`<cross-ref>`) and add the unique identifier for that particular reference, i.e.

```
<cross-ref refid="ref2">[2]</cross-ref>.
```

The link is then established. For example:

```
... as Van Herwijnen describes in [2]...
```

Chapter 3

Article structure

In this chapter we will describe the main structure of the document type definition for full-length articles. Since it is impossible to give a complete, in-depth description of the structure of a full-length article in normal English, i.e. without making use of SGML, the document type definition – see appendix D – remains the final reference. A semi-graphical representation of the overall structure of a full-length article, the type of document described by this DTD, is given in figure 3.1.

The article as a whole is identified by the following opening and closing tags:

Opening tag: `<art>`, mandatory.

Closing tag: `</art>`, optional.

At the highest level, an article can be split into the following parts: copyright information, document head, document topic, front matter, body matter and back matter. Only the copyright element is mandatory.

For an example of a complete front matter, please see page 10.

The `art` element has the following attributes: `version`, `jid`, `aid`, `pii`, `docsubty`, `refers-to` and `language`.

The attribute `version` denotes the version of the DTD that has to be used with the article in question. This is a fixed attribute, and its value should be 4.1.0.

The attributes `jid` and `aid` are the journal identifier and article identifier respectively. Both are required attributes.

The `pii` attribute is a NMTOKEN attribute, and contains the PII. The PII is the Publisher Item Identifier, which uniquely identifies a publication item.

The attribute `docsubty` replaces the ‘publication item type’ of earlier versions, and can have the following values: `abs` (abstract), `add` (addendum), `adv` (advertisement), `ann` (announcement), `brv` (book review), `cal` (calendar), `cnf` (conference), `cor` (correspondence), `dis` (discussion), `edi` (editorial), `err` (erratum), `fla` (full-length article), `lit` (literature alert), `mis` (miscellaneous), `nws` (news), `pnt` (patent), `prp` (personal report), `prv` (product review), `pub` (publisher’s note), `rev` (review article), `sco` (short communication), `ssu` (short survey).

The `refers-to` attribute is another free-text attribute, and contains the PII of the parent document, i.e. the document the present one refers to. This is mostly used for errata and correspondence items.

The last attribute, `language`, specifies the main language of the document, by means of a two-letter language code taken from International Standard ISO 639:1988; the recognized codes are `en` (English, default), `fr` (French), `de` (German), `es` (Spanish), `pt` (Portuguese) and `ru` (Russian).

3.1 Copyright information

Opening tag: `<copyright>`, mandatory.

Closing tag: `</copyright>`, optional.

The content of `copyright` is the copyright holder, if any. Its mandatory attribute `yr` is the copyright year. This is the year of first publication or the year when the copyright status of the article was consciously decided upon.

The mandatory attribute `type` indicates in which way copyright has been transferred. This is shown in the following table, where `XX` is one of ‘B.V.’, ‘Inc.’, ‘Ltd.’, ‘S.A.’, etc., and the status refers to the copyright status from the official table of Copyright Notices [12, 13].

art	copyright		article
	dochead		copyright information
	doctopic		document header
	fm		document topic
		atlfn	front matter
		atl	article footnote
			article title
		sbt	sub-title
		prs	presented by
		ded	dedicated to
		aug	author group
			collaboration
		collab	author
		au	organization reference
		cross-ref	correspondence address
		cor	electronic-mail address
		ead	affiliation
		aff	received
		re	revised
		rv	accepted
		acc	miscellaneous information
		misc	abstract(s)
		abs	paragraph(s) of text
			keyword group(s)
		kwdg	keyword
			nomenclature
		p	article body
		kwd	salutation
	bdy		paragraph(s) of text
			sectional unit
			section number
		no	section title
		st	paragraph(s) of text
		p	sectional unit
		sec	back matter
	bm		acknowledgements
			paragraph(s) of text
			appendix matter
		ack	appendix(ces)
			bibliographic reference list
		appm	section title
			bibliographic reference
		app	further reading list
			section title
		bibl	bibliographic reference
			bibliographic reference list
		st	section title
		bib	bibliographic reference
			bibliographic reference list
		st	section title
		bib	bibliographic reference
			bibliographic reference list
		st	section title
		glossary	bibliographic reference
			biographic information
		st	paragraph(s) of text
		glossary-entry	
		vt	
		p	

Figure 3.1: Semi-graphical representation of main structure of article. Only the first four levels are shown.

status	type	copyright holder
1	unknown	empty
2, 8	full-transfer	Elsevier Science <i>XX</i>
3	us-gov	empty
4	crown	empty
5	limited-transfer	Elsevier Science <i>XX</i>
6	other	name of author or employer
7	no-transfer	empty
9	society	name of society
10	joint	Elsevier Science <i>XX</i> and name of society

Sample output for each status is given below. The text marked with an underline is taken from the `copyright` element, while the remaining text has to be generated.

status	typical output
1	© <u>1997</u> Published by Elsevier Science <i>XX</i> All rights reserved.
2, 5, 8	© <u>1997 Elsevier Science <i>XX</i></u> All rights reserved.
3	Published by Elsevier Science <i>XX</i> .
4	Crown copyright © <u>1997</u> Published by Elsevier Science <i>XX</i> . All rights reserved.
6	© <u>1997 S. Yamamoto</u> . Published by Elsevier Science <i>XX</i> . All rights reserved.
7	not applicable
9	© <u>1997 IFIP</u> . Published by Elsevier Science <i>XX</i> . All rights reserved.
10	© <u>1997 Elsevier Science <i>XX</i> and IFIP</u> . All rights reserved.

If an article is free of copyright, this is denoted by `type="other"` and an empty content.

3.2 Document header

Opening tag: `<dochead>`, mandatory.

Closing tag: `</dochead>`, optional.

The `dochead` element contains the (optional) header, in earlier versions called the ‘article type’, that is usually printed above the title of the document, e.g. “Rapid communication”. The contents of this element is unstructured text.

3.3 Document topic

Opening tag: `<doctopic>`, mandatory.

Closing tag: `</doctopic>`, optional.

If the document appears in a sectionalized journal, the value of the element `doctopic` is the name of the section of the journal in which this document goes, e.g. “Particles and fields”. In these journals the presentation style may choose not to print the document topic, but it can be reused for example to produce the table of contents. The contents of this element is unstructured text.

3.4 Front matter

Opening tag: `<fm>`, mandatory.

Closing tag: `</fm>`, optional.

Front matter consists of the following elements (in this order):

- article footnote (optional, repeatable)
- article title (optional, repeatable)
- presented by (optional)
- dedication (optional)
- author group (optional, repeatable)
- received date (optional)
- revised date (optional, repeatable)
- accepted date (optional)
- miscellaneous information (optional)
- abstract (optional, repeatable)
- keyword group (optional, repeatable)
- nomenclature (optional)

An example of the start of an article marked up in SGML is given in figure 3.2. This example could be presented as shown in figure 3.3.

3.4.1 Article footnote

Opening tag: `<at1fn>`, mandatory.

Closing tag: `</at1fn>`, optional.

The article footnote is a special footnote attached to the *whole* article. It should be distinguished from footnotes contained *in* the title. The article footnote consists of paragraphs. Unlike ordinary footnotes, the article footnotes generate a footnote mark, which in presentation is usually added to the first article title. Article footnotes are used for acknowledging grants, for disclaimers, and other notes belonging to the entire article.

3.4.1.1 Paragraph

Opening tag: `<p>`, mandatory.

Closing tag: `</p>`, optional.

Contents: text¹.

3.4.2 Article title

Opening tag: `<at1>`, mandatory.

Closing tag: `</at1>`, optional.

The element article title consists of text and an optional sub-element sub-title. The order of appearance of these elements is fixed. The start tag `<at1>` has one optional attribute, `language`, which defines the language of the title, if this is different from the main language of the document; its values are the two-letter language codes explained above.

3.4.2.1 Subtitle

Opening tag: `<sbt>`, mandatory.

Closing tag: `</sbt>`, optional.

Contents: text.

3.4.3 Presented by

Opening tag: `<prs>`, mandatory.

Closing tag: `</prs>`, optional.

Contents: text (a statement identifying the presenter of the article).

3.4.4 Dedication

Opening tag: `<ded>`, mandatory.

Closing tag: `</ded>`, optional.

Contents: text (the dedicatory text of this article).

1. In descriptions of the contents of elements the term 'text' stands for contents of the kind described in chapter 4 (%data;) — for a further explanation see chapter 4.

```

<!doctype art public "-//ES//DTD full length article DTD version 4.1.0//EN"[
<!entity sb1 system "sb1" subdoc>
<!entity gr1 system "gr1" ndata image>
<!entity gr2 system "gr2" ndata image>
<!entity aul system "aul" ndata audio]>
<art version="4.1.0" jid="COMAID" aid="550" docsubty="FLA" pii="S0167839697000186">
<copyright type="full-transfer" yr="1997">Elsevier Science B.V.
<dochead>Research report
<fm>
<atl>Decomposition of organic hydroperoxides on cation exchangers
<prs>Presented by P. Fejes
<aug>
<au><fnm>P.<snm>Fejes<fn id="fn1"><p>Partially supported by ...
    </fn><cross-ref refid="fn1"><sup>1</sup></cross-ref></au>
<cross-ref refid="vt1"></cross-ref>
<cross-ref refid="aff1 aff2"><sup>a, b</sup></cross-ref>
<cor>Corresponding author.</cor>
<au><fnm>R.J.<snm>Cripps</au>
<cross-ref refid="aff2"><sup>b</sup></cross-ref>
<aff id="aff1"><no>a</no>Babes-Bolyai University, Faculty of Economic Sciences,
Laboratory of Chemical Technology, R-3400 <cty>Cluj-Napoca (Kolozsvar)</cty>,
<cny cny-code="ro">Romania</cny>
<aff id="aff2"><no>b</no>University of Birmingham, Geometric Modelling
Group, <cty>Birmingham</cty> B15 2TT, <cny cny-code="gb">United Kingdom</cny>
<re day="4" mo="7" yr="1994">
<rv day="20" mo="5" yr="1997">
<abs><p>The acid catalyzed decomposition of p-tert-butylcumene hydroperoxide results
in acetone and p-tert-butylphenol as the main products. This paper deals with the
experimental results obtained on strongly acidic activated cation exchanger resins. ...
<kwdg>
<kwd>Acidity</kwd>
<kwd>Cation exchangers</kwd>
<kwd>Organic peroxides decomposition</kwd>

```

Figure 3.2: Example of the beginning of an article marked up in SGML.

Research report

Decomposition of organic hydroperoxides on cation exchangers

P. Fejes^{a,b,*} and R.J. Cripps^b

^a *Babes-Bolyai University, Faculty of Economic Sciences, Laboratory of Chemical Technology, R-3400 Cluj-Napoca (Kolozsvar), Romania*

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Received 4 July 1994; revised 20 May 1997

Presented by P. Fejes

Abstract The acid catalyzed decomposition of p-tert-butylcumene hydroperoxide results in acetone and p-tert-butylphenol as the main products. This paper deals with the experimental results obtained on strongly acidic activated cation exchanger resins. ...

Keywords Acidity; Cation exchangers; Organic peroxides decomposition.

...

* Corresponding author.

¹ Partially supported by ...

Figure 3.3: Example of the formatted form of the start of an article that is marked up in SGML.

3.4.5 Author group

Opening tag: <aug>, mandatory.

Closing tag: </aug>, optional.

An author group consists of one or more ‘author blocks’, followed by zero or more affiliation addresses. An ‘author block’ consists of a collaboration or an author, followed by zero or more cross-references (typically to biographies and affiliation elements), an optional correspondence address, and zero or more electronic-mail addresses. The element `cor` specifies the correspondence address (see 3.4.5.3).

An author group must contain at least one collaboration or one author. These elements may be repeated, and the order in which they appear is free. The structures

- *collaboration₁ author₁,*
- *author₁ author₂ collaboration₁*
- *collaboration₁ author₁ collaboration₂ collaboration₃*

are all valid first parts of author groups. The application that processes the SGML document, and produces printed output for instance, needs to take care of punctuation, e.g. ‘and’ and commas, that need to be inserted when presenting the document instance in a particular form.

The list of collaboration(s) and/or author(s) (which contains at least one of these elements) may be followed by one or more affiliations. The relation between an author and an affiliation (‘where the author worked at the time the article was submitted’) can be made explicit by means of the `id` attribute of the affiliation, and a cross-reference with `cross-ref`.

3.4.5.1 Collaboration

Opening tag: <collab>, mandatory.

Closing tag: </collab>, mandatory.

Contents: text.

A collaboration is a named group or cooperation. As is the case with an author, a collaboration can be explicitly related to an affiliation, by means of the elements organization reference and organization identifier, and also implicitly, by having an affiliation immediately following the collaboration.

A collaboration consists of an optional `index` element, text, and an optional collaboration affiliation (`caff`).

The `index` element gives the form used for entering in the author index. The textual content of the `collab` element, minus the `index` and `caff` elements, is used for printing.

3.4.5.1.1 Collaboration affiliation

Opening tag: <caff>, mandatory.

Closing tag: </caff>, optional.

Contents: unstructured text (cf. the affiliation element `aff`).

3.4.5.2 Author

Opening tag: <au>, mandatory.

Closing tag: </au>, mandatory.

An author element consists of a list of degrees (optional), a first name (optional), a surname (mandatory), a suffix (optional), a list of degrees (optional), and a list of rôles (optional). The first name and surname can also appear in reversed order. The suffix element `jr` is intended to mark codes such as Sr, Jr, or the ‘III’ in Henry Ford III. It is not to be used for titles such as Professor, Doctor, Lord, etc. These (academic or nobility) titles should be separated from the author names, and tagged as `degs` elements.

3.4.5.2.1 First name

Opening tag: <fnm>, mandatory.

Closing tag: </fnm>, optional.

Contents: text.

The element `fnm` starts with an optional sub-element, `inits`. This specifies the initials as they should be used whenever the first name is abbreviated to initials. If this attribute is missing, the initials are derived from the first name automatically. If the `fnm` element consists of initials only, no `inits` needs to be present. For example: if an author with first name ‘Christian’ would like to see this abbreviated to ‘Chr.’² this would be marked up as follows.

```
<fnm>
  <inits>Chr.</inits>
  Christian
</fnm>
```

3.4.5.2.2 Surname

Opening tag: `<snm>`, mandatory.

Closing tag: `</snm>`, optional.

Contents: text.

The element `snm` starts with an optional sub-element, `index`, which specifies the key that should be used in, e.g., sorting an author index. For example, suppose an article has an author with surname Börsig, and this surname needs to be sorted in an author index as Borsig. In that case, one would have to specify the surname as

```
<snm>
  <index>Borsig</index>
  B<a><ac>o<ac>&uml;</a>rsig
</snm>
```

Note that this does not affect the *actual* surname printed.

3.4.5.2.3 Suffix

Opening tag: `<jr>`, mandatory.

Closing tag: `</jr>`, optional.

Contents: text (the suffix part of the author’s name as explained in 3.4.5.2).

3.4.5.2.4 Degrees

Opening tag: `<degs>`, mandatory.

Closing tag: `</degs>`, optional.

Contents: text.

This element specifies a sequence of degrees before or after an author’s name. For example

```
<au>
  <fnm>Stig
  <snm>Steen
  <degs>MD, PhD
</au>
```

3.4.5.2.5 Roles

Opening tag: `<roles>`, mandatory.

Closing tag: `</roles>`, optional.

Contents: text.

This element specifies a sequence of rôles or job-titles after an author’s name. For example

```
<au>
  <fnm>Francis
  <snm>Urquhart
  <roles>Past Chair ACGIH
</au>
```

2. The way first names are abbreviated is determined by country and culture.

3.4.5.3 Correspondence address

Opening tag: <cor>, mandatory.
 Closing tag: </cor>, optional.
 Contents: text.

This element specifies the correspondence address for this article, or otherwise identifies the corresponding author. It consists of text and does not contain structural sub-elements. The correspondence address belongs to the collaboration or author that immediately precedes it. Usually there is only one cor element in the entire front matter.

3.4.5.4 Electronic-mail address

Opening tag: <ead>, mandatory.
 Closing tag: </ead>, optional.
 Contents: text.

This element specifies the electronic-mail address for the immediately preceding collaboration or author. It consists of text and does not contain structural sub-elements.

3.4.5.5 Affiliation

Opening tag: <aff>, mandatory.
 Closing tag: </aff>, optional.

The affiliation element, aff, consists of an optional number (no, which contains the label of the affiliation, as described in section 4.6), text, an optional city element (cty), a mandatory country element (cny), and text. The order of these components, text, city, country and text, is fixed. The aff element has an identifier attribute, id, which can be used for cross-referencing by means of cross-ref.

3.4.5.5.1 City

Opening tag: <cty>, mandatory.
 Closing tag: </cty>, mandatory.
 Contents: text.

3.4.5.5.2 Country

Opening tag: <cny>, mandatory.
 Closing tag: </cny>, mandatory.
 Contents: text.

The cny (country) element has an optional attribute cny-code, which specifies the country code for that country. Its value is a two-letter code for the country, as defined in International Standard ISO 3166, see appendix F.

3.4.6 Received date

Opening tag: <re>, mandatory.
 Closing tag: none.
 Contents: none.

The re element is an empty element, i.e. an element that has no content and therefore no end-tag. The start tag has three required attributes day, mo and yr of numeric type, which define the components day, month and year of the received date, respectively. The received date should be presented in the language of the entire document, i.e. according to the value of the language attribute of art. For example, in an article written in French <re day=2 mo=2 yr=1995> should be presented as, e.g., “Reçu le 2 février 1995”.

3.4.7 Revised date

Opening tag: <rv>, mandatory.
 Closing tag: none.
 Contents: none. See definition of <re> (received date).

3.4.8 Accepted date

Opening tag: `<acc>`, mandatory.

Closing tag: none.

Contents: none. See definition of `<re>` (received date).

3.4.9 Miscellaneous history information

Opening tag: `<misc>`, mandatory.

Closing tag: `</misc>`, optional.

Contents: text.

This element marks a line (text) in the history that specifies some extra information, for example the communicating editor. Examples: “Communicated by D.D. Holm”, or “Recommended by S.S. Gupta”. Whether or not the `misc` element generates extra fixed text depends on the style sheet.

3.4.10 Abstract

Opening tag: `<abs>`, mandatory.

Closing tag: `</abs>`, optional.

An abstract consists of a sequence of one or more paragraphs or sections. The start tag `<abs>` has two optional attributes: `class` and `language`. The `class` attribute specifies the type of abstract, ‘author’s abstract’, ‘editor’s abstract’, ‘INSPEC abstract’ or ‘teaser abstract’ (a condensed or highlight abstract). The `language` attribute specifies the language of the abstract, if different from the main language of the document.

3.4.11 Keyword group

Opening tag: `<kwdg>`, mandatory.

Closing tag: `</kwdg>`, optional.

A keyword group consists of one or more keywords, i.e. `kw` elements. The start tag `<kwdg>` has two optional attributes: `class`, which identifies the type of keyword, and `language`, which specifies the language of the keyword group, if different from the main language of the document.

The following keyword classes are recognized: `kw` (uncontrolled keyword, default), `abr` (abbreviations), `jel` (JEL classification codes), `msc` (mathematical subject codes), `pacs` (PACS classification codes), `neurosci` (neuroscience classification codes), `psycinfo` (psychological classification codes), `inspec-cc` (INSPEC classification code), `inspec-ct` (INSPEC classification term), `inspec-chi` (INSPEC chemical index), `mat` (materials), `src` (sources), and `idt` (other subject-index terms).

An example:

```
<kwdg class="neurosci">
  <kw>Cellular and Molecular Biology
    <kw>Blood&ndash;brain barrier
  </kw>
</kwdg>
```

In this example nested keywords are used. The value of the `class` attribute indicates that the first-order keyword should be interpreted as a “Theme” and the second-order one as a “Topic”.

3.4.11.1 Keyword

Opening tag: `<kw>`, mandatory.

Closing tag: `</kw>`, mandatory.

Contents: text.

This element contains one keyword, i.e. arbitrary text, with possibly nested (sub-)keywords.

3.4.12 Nomenclature

Opening tag: <nomenclature>, mandatory.

Closing tag: </nomenclature>, optional.

A nomenclature consists of one or more definition lists, i.e. dl elements.

3.5 Body

Opening tag: <body>, mandatory.

Closing tag: </body>, optional.

The article body consists of an optional salutation, followed by a sequence of paragraphs and/or sections in arbitrary order. There must be at least one paragraph or one section, but there may be any number of paragraphs and sections, and in any order. The following structures are all valid body structures:

- *paragraph₁ section₁*
- *section₁ section₂*
- *section₁ paragraph₁ section₂ paragraph₂*

Note that paragraphs are not necessarily parts of sections.

3.5.1 Salutation

Opening tag: <salutation>, mandatory.

Closing tag: </salutation>, optional.

Contents: text.

The salutation element specifies the opening phrase of the article body, such as e.g. “Dear Sir”. This is mostly used in editorial or correspondence items.

3.5.2 Section

Opening tag: <sec>, mandatory.

Closing tag: </sec>, mandatory.

A section consists of an optional number (no, see 4.6) and an optional section title (st), followed by an arbitrary sequence of paragraphs and/or sections. A section must contain at least one paragraph or one section, but there may be any number of paragraphs and sections, and in any order. Section can be the target for cross-reference by means of cross-ref.

A section may have a section title. If it has one, the title must be the first or second element of the section (depending on whether there is a no element). The basic building blocks of sections are paragraphs and sections (which then become subsections). The simplest section consists of one paragraph, optionally preceded by a section title:

```
<sec>
paragraph
</sec>
```

Paragraphs may be repeated, resulting in, for example:

```
<sec>
paragraph-1
paragraph-2
paragraph-3
</sec>
```

The simplest structure of a section containing a subsection is the following:

```
<sec>
  <sec> paragraph-1      : paragraph belongs to subsection
  </sec>
</sec>
```

and so further for deeper levels of embedding:

```

<sec>
  <st> title-1           : section title
  <sec> paragraph-1     : paragraph belongs to subsection
</sec>
  <sec> paragraph-2     : paragraph belongs to subsection
</sec>
  <sec> paragraph-3     : paragraph belongs to subsection
    <sec> paragraph-4   : paragraph belongs to subsubsection
  </sec>
</sec>
</sec>

```

Note that structures such as `<sec></sec>`, `<sec><sec></sec></sec>` etc., are not valid, since the tags `<sec>` and `</sec>` must enclose at least one paragraph or subsection.

No special subsection article elements with explicit mention of nesting depth, e.g. `sec1`, `sec2`, `sec3`, . . . , have been defined. This would have been an alternative to embedding sections within sections. Advantages of the option implemented in the current version of the DTD are that editors need not bother about the depth of the section (subsection, subsubsection, subsubsubsection, . . .), and that there is no *a priori* limit to the depth of embedding sections. A disadvantage is that the level of embedding of a section cannot be derived from the name of the section element.

3.5.2.1 Section title

Opening tag: `<st>`, mandatory.

Closing tag: `</st>`, optional.

Contents: text.

3.6 Back matter

Opening tag: `<bm>`, mandatory.

Closing tag: `</bm>`, optional.

Back matter consists of six optional parts: acknowledgement, appendix matter, a sequence of bibliographic lists, a sequence of further-reading lists, zero or more glossaries, and zero or more vitae. The order of these elements is fixed.

“Addendum”, “Note added in proof” and “Questions and answers” should – where needed – be treated as sections of the body of the document, or as an appendix.

3.6.1 Acknowledgement

Opening tag: `<ack>`, mandatory.

Closing tag: `</ack>`, optional.

An acknowledgement consists of one or more paragraphs.

3.6.2 Appendix matter

Opening tag: `<appm>`, optional.

Closing tag: `</appm>`, optional.

The main reason for inserting the element appendix matter is to make this DTD compatible with the AAP DTD (see also appendix A). Note that both the start tag and the end tag are optional.

Appendix matter consists of one or more appendices.

3.6.2.1 Appendix

Opening tag: `<app>`, mandatory.

Closing tag: `</app>`, optional.

An appendix has the same structure as a section, i.e. it consists of an optional number and an optional section title, followed by an arbitrary sequence of paragraphs and/or sections. There must be at least one paragraph or one section,

but there may be any number of paragraphs and sections, and in any order. See 3.5.2 for further explanation. Note that the constituting elements of section and appendix are identical.

Appendix can be the target for cross-reference by means of `cross-ref`.

3.6.3 Bibliographic list

Opening tag: `<bibl>`, mandatory.

Closing tag: `</bibl>`, optional.

A bibliographic list consists of an optional heading and one or more bibliographic references. The optional heading (`st`) is used for sub-headings within the bibliography, which is useful if there is more than one bibliographic list in the backmatter.

3.6.3.1 Bibliographic reference

Opening tag: `<bib>`, mandatory.

Closing tag: `</bib>`, optional.

A bibliographic reference identifies a document or some other source of information that is referred to (cited) in the text. In the current version of the DTD bibliographic references to journal articles, books, articles in books, proceedings, articles in proceedings, articles in special issues, and preprints are supported; references to other types of publications consist of text.

Syntactically, a bibliographic reference consists of an optional number, and one reference to an article or similar publication, or one reference to another type of publication. It can be the target for cross-reference by means of `cross-ref`.

The number (`no`) contains the label used in the bibliography, e.g. something like '[3]', '[Go90]', or 'Goldfarb, 1990' (see also section 4.6).

In designing the DTD fragment for references, we assumed that there is an unambiguous relation between citations in the text and bibliographic references in the back matter of the document. Therefore, the present DTD does not support multiple references under one item in the reference list, i.e. one bibliographic reference is one document. However, it does support the practice that for a certain document multiple publications are identified. Examples of this practice are references 11 and 13 in section 3.6.3.2. To account for this type of reference, we introduced the elements `contribution` and `host`; see sections 3.6.3.1.2 and 3.6.3.1.9.

3.6.3.1.1 Reference to article or similar publication

Opening tag: `<bb>`, mandatory.

Closing tag: `</bb>`, optional.

The element `bb` is reserved for references to textual documents, or, to be more precise: documents that are similar to articles, i.e. the type of document described by the present DTD. Publications such as, e.g., patents and maps are not included in this category.

A bibliographic reference to an article-like publication consists of an optional `contribution`, and one or more `hosts`.

3.6.3.1.2 Contribution

Opening tag: `<contribution>`, mandatory.

Closing tag: `</contribution>`, optional.

A `contribution` is an abstract entity that denotes the independent text or other object (e.g. map, audiotape, television program) and a `host` the physical entity that 'contains' the `contribution`. Where the `contribution` is a text, the `host` may be any such entity as book or issue. We use these terms in a somewhat different sense than ISO 690-2 [9]; the way we use it, the term `contribution` refers not only to text, as happens in the ISO document, but also to other objects that are referred to in reference lists, and in the present DTD fragment a `host` may contain, contrary to what ISO suggests, only one `contribution`.

In our analysis a monograph, or 'simple' book, consists of a `contribution` and a `host`, where the `host` contains only one `contribution`. This `contribution` could, in principle, be published in other `hosts` as well: as a chapter in a multiple

contributions book, or as an e-publication on the Internet. A contribution contains certain inalienable characteristics: in our proposed model, text-type contributions are defined by their author(s) and title(s). A map-type contribution (which we did not yet consider in depth, but which will probably be added in a future version) could be characterised by cartographer, geographical identification and scale. A host contains bibliographic data of the physical publication, such as an editor, an edition, a title, a publisher and a publication date for books. In the current model, every reference item refers to at most one contribution, with at least one, but possibly more, hosts.

Syntactically, a contribution consists of an optional author group, an optional title group, and an optional comment.

The contribution element has an optional attribute `language` which takes values in the list of two-letter language codes ISO 639, see appendix G. It is used to identify the language of the contribution.

The title group is either (1) a title optionally followed by a translated title, or (2) a translated title. Often, we find references with a made-up title in English, and the comment ‘in Japanese’ or ‘in Chinese’, while the original Japanese or Chinese title is missing. This should be coded by tagging the English title as a translated title, while the original language (`ja`, `zh`) can be coded in the host’s language attribute. The comments ‘in Japanese’ or ‘in Chinese’ are tagged as `comment`.

3.6.3.1.3 Authors

Opening tag: `<authors>`, mandatory.

Closing tag: `</authors>`, optional.

An author group in a bibliographic reference consists of one or more blocks. Each block is either a collaboration element `collab`, or one or more author elements `author`, followed by an optional *et al.* indicator.

In case an author group contains both collaborations and authors, these can occur in any desired order. However, there is no mechanism for inserting ‘embedded text’ that indicates the relations between the authors and the collaboration(s), for example certain connective words, commas (or absence thereof), or parentheses. For example, the following

- Abe on behalf of the ZEUS Collaboration, ...
- Abe (ZEUS Collaboration), ...
- Presented by Abe for the ZEUS Collaboration, ...

will either have to be rewritten as

```
<authors>
  <author>
    <snm>Abe
    <collab>ZEUS Collaboration
</authors>
```

or the entire reference of which this is a part must be treated as an unstructured reference (`other-ref`). In the latter case the entire text of the reference can be preserved. It is treated as flat text, in other words without any logical structuring, and is therefore less suitable for linking in an electronic environment.

3.6.3.1.4 Author

Opening tag: `<author>`, mandatory.

Closing tag: `</author>`, optional.

An author in a bibliographic reference consists of a surname `snm`, followed by an optional first name `fnm`, and an optional “junior” suffix `jr`.

3.6.3.1.5 Et al

Opening tag: `<et-al>`, mandatory.

Closing tag: none.

The `et-al` is an empty element. Its presence indicates the omission of other authors or editors, in other words the need for the insertion of the text “*et al.*” in the bibliographic reference.

3.6.3.1.6 Title in bibliographic reference

Opening tag: <title>, mandatory.

Closing tag: </title>, optional.

A title in a bibliographic reference consists of text, optionally followed by a sub-title *sbt*.

3.6.3.1.7 Translated title

Opening tag: <translated-title>, mandatory.

Closing tag: </translated-title>, optional.

A translated title in a bibliographic reference consists of text, optionally followed by a sub-title *sbt*. Translators are not yet covered in the present DTD fragment; however, if these are present, they can be captured in the comment element.

3.6.3.1.8 Comment

Opening tag: <comment>, mandatory.

Closing tag: </comment>, optional.

References as found in the manuscript supplied by the author(s) may contain ‘free text’ interspersed between capturable pieces of text. In order to provide a way to accommodate such text, the *comment* element is available as the last element of both contribution and host.

3.6.3.1.9 Host

Opening tag: <host>, mandatory.

Closing tag: </host>, optional.

In a bibliographic reference, the host is the physical entity that ‘contains’ the contribution. It consists of exactly one of the elements *issue*, *book*, *edited-book* or *electronic host (e-host)*, optionally followed by *comment*.

3.6.3.1.10 Issue

Opening tag: <issue>, mandatory.

Closing tag: </issue>, optional.

An issue consists of an optional editor group, an optional title group (see section 3.6.3.1.2), an optional conference, a series, an optional issue number, a date, and an optional page range. An issue with a title is considered to be a special issue; see the second example in section 3.6.3.2. Since a special issue may have guest editors, its model contains the element *editors*. Proceedings are either published in a special issue, or an edited-book. Therefore, the model for issue contains optional conference data.

3.6.3.1.11 Conference

Opening tag: <conference>, mandatory.

Closing tag: </conference>, optional.

Contents: text (information about conference).

3.6.3.1.12 Editors

Opening tag: <editors>, mandatory.

Closing tag: </editors>, optional.

An editor group in a bibliographic reference consists of one or more *editor* elements, optionally followed by an *et al.* indicator.

3.6.3.1.13 Editor

Opening tag: <editor>, mandatory.

Closing tag: </editor>, optional.

An editor in a bibliographic reference consists of a surname *snm*, followed by an optional first name *fnm*, and an optional “junior” suffix *jr*.

3.6.3.1.14 Series

Opening tag: `<series>`, mandatory.

Closing tag: `</series>`, optional.

Issues have mandatory series information, `series`, containing a title group (title and optional translated title, or just translated title) and an optional volume number (or range of volume numbers). Books and edited books have optional series information, `book series`, that adds editors to the series information.

3.6.3.1.15 Volume number

Opening tag: `<volume-nr>`, mandatory.

Closing tag: `</volume-nr>`, optional.

Contents: text (volume number or range of volume numbers).

3.6.3.1.16 Issue number

Opening tag: `<issue-nr>`, mandatory.

Closing tag: `</issue-nr>`, optional.

Contents: text (issue number or range of issue numbers).

3.6.3.1.17 Date

Opening tag: `<date>`, mandatory.

Closing tag: `</date>`, optional.

Contents: text.

This element contains the date of publication of the host.

It seems logical to assign a date to the element contribution, denoting its ‘inception’. Inception dates are, however, not used. The inception date is identical to the publication date of the ‘first’ host.

3.6.3.1.18 Pages

Opening tag: `<pages>`, mandatory.

Closing tag: `</pages>`, optional.

The page range element `pages` consists of a first page, optionally followed by a last page.

3.6.3.1.19 First page

Opening tag: `<first-page>`, mandatory.

Closing tag: `</first-page>`, optional.

Contents: text.

3.6.3.1.20 Last page

Opening tag: `<last-page>`, mandatory.

Closing tag: `</last-page>`, optional.

Contents: text.

3.6.3.1.21 Book

Opening tag: `<book>`, mandatory.

Closing tag: `</book>`, optional.

A book in a bibliographic reference consists of an optional title group (see above), an optional edition, an optional book series, one or more dates, and an optional publisher.

3.6.3.1.22 *Edition*

Opening tag: <edition>, mandatory.
Closing tag: </edition>, optional.
Contents: text.

3.6.3.1.23 *Publisher*

Opening tag: <publisher>, mandatory.
Closing tag: </publisher>, optional.

A publisher consists of a name, optionally followed by a location.

3.6.3.1.24 *Publisher name*

Opening tag: <name>, mandatory.
Closing tag: </name>, optional.
Contents: text (publisher name).

3.6.3.1.25 *Publisher location*

Opening tag: <location>, mandatory.
Closing tag: </location>, optional.
Contents: text (publisher location).

3.6.3.1.26 *Edited book*

Opening tag: <edited-book>, mandatory.
Closing tag: </edited-book>, optional.

An edited book consists of an optional editor group (see above), an optional title group (see above), an optional conference, an optional edition, an optional book series, one or more dates, an optional page range, and an optional publisher. Proceedings are either published in a special issue, or an edited-book. Therefore, the model for edited-book contains optional conference data.

3.6.3.1.27 *Book series*

Opening tag: <book-series>, mandatory.
Closing tag: </book-series>, optional.

A book series consists of an optional editor group and a series.

3.6.3.1.28 *Electronic host*

Opening tag: <e-host>, mandatory.
Closing tag: </e-host>, optional.
Contents: text and one optional sub-element.

This element is be used for tagging independent electronic hosts for bibliographic references. A possible application of this element is shown in example 13 in section 3.6.3.2.

The e-host element consists of an optional inter-document reference and an optional date element. The date element is mandatory with all other hosts, but in electronic hosts it is often lacking; this made it necessary to add it as an optional constituent.

In future, a reference type e-publication will probably be added, at the same level as patents and maps, to account for more complex references to electronic publications. Presumably, the element e-host will be part of the definition of the future e-publication.

3.6.3.1.29 Other reference

Opening tag: <other-ref>, mandatory.

Closing tag: </other-ref>, optional.

Contents: text.

This element is used for references to publications that are not similar to articles, so for example patents and maps. It contains no sub-elements.

3.6.3.2 Examples of bibliographic references

This section contains fourteen examples of references tagged according to the present DTD fragment for bibliographic references. Indentation, line breaks and spacing are used in these examples for clarity only: in actual documents these will be absent.

1. Journal article, 2 authors et al., paginated by issue.

[1] Paivio, A. & Becker, L.J. *et al.* (1975) Comparisons through the mind's eye. *Cognition*, 37 (2), 635–647.

```
<bib id="ref1">
  <no>[1]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Paivio
          <fnm>A.
        <author>
          <snm>Becker
          <fnm>L.J.
        <et-al>
      <title>Comparisons through the mind's eye
    <host>
      <issue>
        <series>
          <title>Cognition
          <volume-nr>37
        <issue-nr>2
        <date>1975
        <pages>
          <first-page>635
          <last-page>647
```

2. Entire issue of journal. Because the issue has a title, it is presented as a special issue.

[2] Glaser, R. & Bond, L. (Eds.) (1981) Testing: concepts and research [Special issue]. *American Psychologist*, 36 (10)

```
<bib id="ref2">
  <no>[2]</no>
  <bb>
    <host>
      <issue>
        <editors>
          <editor>
            <snm>Glaser
            <fnm>R.
          <editor>
            <snm>Bond
            <fnm>L.
        <title>Testing: concepts and research
      <series>
        <title>American Psychologist
        <volume-nr>36
      <issue-nr>10
      <date>1981
```

3. Journal supplement, only first page given.

[3] Koczkas, S., Holmberg, G. & Wedin, L. (1981) A pilot study of the effect of ... Acta Psychiatrica Scandinavica, 63 (Suppl. 290), 328

```
<bib id="ref3">
  <no>[3]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Koczkas
          <fnm>S.
        <author>
          <snm>Holmberg
          <fnm>G.
        <author>
          <snm>Wedin
          <fnm>L.
      <title>A pilot study of the effect of \ldots
    <host>
      <issue>
        <series>
          <title>Acta Psychiatrica Scandinavica
          <volume-nr>63
          <issue-nr>Suppl. 290
          <date>1981
        <pages>
          <first-page>328
```

4. Non-English journal article, title translated into English.

[4] Assink, E.M.H. & Verloop, N. (1977) Het aanleren van deel-geheel relaties [Teaching part-whole relations]. Pedagogische Studien, 54, 130–142

```
<bib id="ref4">
  <no>[4]</no>
  <bb>
    <contribution language="nl">
      <authors>
        <author>
          <snm>Assink
          <fnm>E.M.H.
        <author>
          <snm>Verloop
          <fnm>N.
      <title>Het aanleren van deel-geheel relaties
      <translated-title>Teaching part-whole relations
    <host>
      <issue>
        <series>
          <title>Pedagogische Studien
          <volume-nr>54
          <date>1977
        <pages>
          <first-page>130
          <last-page>142
```

5. Book, third edition.

[5] Strunk, W., Jr. & White, E.B. (1979) The elements of style (3rd Ed.). New York: MacMillan

```
<bib id="ref5">
  <no>[5]</no>
  <bb>
    <contribution>
      <authors>
```

```

    <author>
      <snm>Strunk
      <fnm>W.
      <jr>Jr.
    <author>
      <snm>White
      <fnm>E.B.
    <title>The elements of style
  <host>
    <book>
      <edition>3rd Ed.
      <date>1979
      <publisher>
        <name>MacMillan
        <location>New York

```

6. Edited book.

[6] Letheridge, S. & Cannon, C.R. (Eds.) (1980) Bilingual education: Teaching English as a second language. New York: Praeger

```

<bib id="ref6">
  <no>[6]</no>
  <bb>
    <host>
      <edited-book>
        <editors>
          <editor>
            <snm>Letheridge
            <fnm>S.
          <editor>
            <snm>Cannon
            <fnm>C.R.
          <title>Bilingual education: Teaching English as a second language
          <date>1980
          <publisher>
            <name>Praeger
            <location>New York

```

7. Book without authors and editors.

[7] College bound seniors (1979) Princeton, NJ: College Board Publications

```

<bib id="ref7">
  <no>[7]</no>
  <bb>
    <host>
      <book>
        <title>College bound seniors
        <date>1979
        <publisher>
          <name>College Board Publications
          <location>Princeton, NJ

```

8. Several volumes in a multi-volume edited work, publication over more than one year.

[8] Wilson, J.G. & Fraser, F.C. (Eds.) (1977–1978) Handbook of teratology (Vols. 1–4). New York: Plenum Press

```

<bib id="ref8">
  <no>[8]</no>
  <bb>
    <host>
      <edited-book>
        <book-series>
          <editors>
            <editor>
              <snm>Wilson
              <fnm>J.G.

```

```

    <editor>
      <snm>Fraser
      <fnm>F.C.
    <series>
      <title>Handbook of teratology
      <volume-nr>Vols. 1&ndash;4
    <date>1977
    <date>1978
    <publisher>
      <name>Plenum Press
      <location>New York

```

9. English translation of a book.³

[9] Luria, A.R. (1969) The mind of a mnemonist (L. Solotarof, Trans.) New York: Avon books (Original work published 1965)

```

<bib id="ref9">
  <no>[9]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Luria
          <fnm>A.R.
        <title>The mind of a mnemonist
        <comment>(L. Solotarof, Trans.)</comment>
      <host>
        <book>
          <date>1969
          <publisher>
            <name>Avon books
            <location>New York
          <comment>(Original work published 1965)</comment>

```

10. Article or chapter in edited book.

[10] Gurman, A.S. & Kniskern, D.P. (1981) Family therapy outcome research: knowns and unknowns. In: A.S. Gurman & D.P. Kniskern (Eds.) Handbook of family therapy (pp. 742–775) New York: Brunner/Mazel

```

<bib id="ref10">
  <no>[10]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Gurman
          <fnm>A.S.
        <author>
          <snm>Kniskern
          <fnm>D.P.
        <title>Family therapy outcome research: knowns and unknowns
      <host>
        <edited-book>
          <editors>
            <editor>
              <snm>Gurman
              <fnm>A.S.
            <editor>
              <snm>Kniskern
              <fnm>D.P.
          <title>Handbook of family therapy
          <date>1981
          <pages>

```

3. There is no separate element for translator yet.

```

    <first-page>742
    <last-page>775
  <publisher>
    <name>Brunner/Mazel
    <location>New York

```

11. Article in edited book, reprinted from another source.

[11] Sluzki, C.E. & Beavin, J. (1977) Symmetry and complementarity. In: P. Watzlawick & J.H. Weakland (Eds.) The interactional view (pp. 71–87) New York: Norton. Reprint from: Acta Psiquiatrica y Psicologica de America Latina, 1965, 11, 321–330

```

<bib id="ref11">
  <no>[11]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Sluzki
          <fnm>C.E.
        <author>
          <snm>Beavin
          <fnm>J.
        <title>Symmetry and complementarity
      <host>
        <edited-book>
          <editors>
            <editor>
              <snm>Watzlawick
              <fnm>P.
            <editor>
              <snm>Weakland
              <fnm>J.H.
            <title>The interactional view
            <date>1977
            <pages>
              <first-page>71
              <last-page>87
            <publisher>
              <name>Norton
              <location>New York
            <comment>Reprint from:</comment>
          <host>
            <issue>
              <series>
                <title>Acta Psiquiatrica y Psicologica de America Latina
                <volume-nr>11
              <date>1965
              <pages>
                <first-page>321
                <last-page>330

```

12. Proceedings published as a book.

[12] Chaddock, T.E. (1974) Gastric emptying of a nutritionally balanced liquid diet. In: E.E. Daniel (Ed.) Proceedings of the Fourth International Symposium on Gastrointestinal Motility (pp. 83–92). Vancouver, British Columbia, Canada: Mitchell Press

```

<bib id="ref12">
  <no>[12]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Chaddock
          <fnm>T.E.

```

```

<title>Gastric emptying of a nutritionally balanced liquid diet
<host>
<edited-book>
  <editors>
    <editor>
      <snm>Daniel
      <fnm>E.E.
    <title>Proceedings of the Fourth International Symposium
    on Gastrointestinal Motility
    <date>1974
  <pages>
    <first-page>83
    <last-page>92
  <publisher>
    <name>Mitchell Press
    <location>Vancouver, British Columbia, Canada

```

13. Preprint.

[13] Yu, F. & Wu, X.-S. (1992) Phys. Rev. Lett., 68, 2996 (hep-th/9112009)

```

<bib id="ref13">
  <no>[13]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Yu
          <fnm>F.
        <author>
          <snm>Wu
          <fnm>X.-S.
      <host>
        <issue>
          <series>
            <title>Phys. Rev. Lett.
            <volume-nr>68
            <date>1992
          <pages>
            <first-page>2996
        <host>
          <e-host><inter-ref object-type="preprint">hep-th/9112009</e-host>

```

14. Article in proceedings, containing several references to external electronic objects.

[14] F. Dougliis and Th. Ball, Tracking and viewing changes on the web (<http://www.research.att.com/orgs/ssr/people/dougliis/papers/aide.ps.gz>). In: Proc. 1996 USENIX Technical Conference (<http://usenix.org/sd96.html>), January 1996.

```

<bib id="ref14">
  <no>[14]</no>
  <bb>
    <contribution>
      <authors>
        <author>
          <snm>Dougliis
          <fnm>F.
        <author>
          <snm>Ball
          <fnm>Th.
      <title>
        <inter-ref locator="http://www.research.att.com/orgs/ssr/people/dougliis/
          papers/aide.ps.gz"
          locator-type="url">Tracking and viewing changes on the web
        </inter-ref>
      <host>

```

```

<edited-book>
  <title>
    <inter-ref locator="http://usenix.org/sd96.html"
              locator-type="url">
      Proc. 1996 USENIX Technical Conference
    </inter-ref>
  <date>January 1996

```

3.6.4 Further reading

Opening tag: `<further-reading>`, mandatory.

Closing tag: `</further-reading>`, optional.

A further-reading list has the same structure as a list of bibliographic references; see section 3.6.3. However, entries in a further-reading list can never be cross-referenced from the text (cited).

3.6.5 Glossary

Opening tag: `<glossary>`, mandatory.

Closing tag: `</glossary>`, optional.

A glossary consists of an optional title, followed by one or more glossary entries. The relation between a phrase in the text and an entry in the glossary can be made by means of the `id` attribute of the glossary entry, and a cross-reference with `cross-ref`.

3.6.5.1 Glossary entry

Opening tag: `<glossary-entry>`, mandatory.

Closing tag: `</glossary-entry>`, mandatory.

A glossary entry consists of a heading, followed by zero or more glossary definitions, zero or more cross-references, and zero or more sub-entries.

3.6.5.1.1 Glossary heading

Opening tag: `<glossary-heading>`, mandatory.

Closing tag: `</glossary-heading>`, mandatory.

A glossary heading consists of text, optionally followed by a sequence of sub-headings.

3.6.5.1.2 Glossary definition

Opening tag: `<glossary-def>`, mandatory.

Closing tag: `</glossary-def>`, mandatory.

A glossary definition consists of text.

3.6.6 Biographic information

Opening tag: `<vt>`, mandatory.

Closing tag: `</vt>`, optional.

The element `vt` can occur zero or more times. Each occurrence of the element `vt` contains the biographic information of *one* of the authors of the document, and consists of one or more paragraphs. A picture of the author, if present, should be included in a separate entity (artwork file), which is then specified with the `picture` attribute of `<vt>`. The relation between an `au` element and a `vt` element is established by an empty `cross-ref` element after the `au` element.

Chapter 4

Text structure

As stated previously, SGML defines the structure of a document, not its presentation on any medium whatsoever. The presentation used in a printed journal, for example, is defined in the typesetting instructions for that particular journal. Defining the text “structure” is not related to its appearance therefore, except where its format must remain fixed, irrespective of the output medium, as is often the case with e.g. mathematical formulas. Another example: a phrase or word may need to be in italic and this needs to be identified.

Individual characters, such as greek characters, will also be defined by means of a code, e.g. `α`, an *entity reference* in SGML terms. These entity references are based on the ISO public entity sets; a complete list can be found in appendix H.

An article (or index, or glossary) as a whole, as defined in the previous chapters, has a coarse-grained structure. The running text, for example of paragraphs, also has a, more fine-grained, structure. This structure consists of elements that are also defined in the DTD. These elements are:

- footnote
- anchor
- quotation
- enunciation
- cross-reference
- number
- link
- intra-document reference
- inter-document reference
- list
- definition list
- table
- in-line figure; floating or displayed figure
- text-box
- unprinted item
- inline and displayed formula
- bibliographic reference
- elements for built-up text, including font changes
- plain text (parsed character data: #PCDATA)

In this chapter these elements are described.

4.1 Footnote

Opening tag: `<fn>`, mandatory.

Closing tag: `</fn>`, mandatory.

A footnote is a note that documents the text, and corresponds to a reference, e.g. a number, in the text. Footnotes consist of an optional number, and one or more paragraphs. Footnotes are printed at the foot of the page. A footnote can be the target for cross-reference by means of `cross-ref`. The contents of the element are put into a ‘floating element’, which is put on the current page when possible, and otherwise on the next page. The tag `<fn>` does not generate a reference in the text. This must be generated with the tag `<cross-ref>` at the place(s) in the text where a footnote

reference needs to appear. The `id` attribute is required for this element. The `no` sub-element contains the footnote mark, see 4.6.

See the relevant typesetting instructions for the journal concerned for details about the presentation of this element.

4.2 Anchor

Opening tag: `<anchor>`, mandatory.

Closing tag: `</anchor>`, mandatory.

An anchor is a piece of text than can be the target of e.g. a cross-reference. The `id` attribute is required for this element.

4.3 Displayed quotation

Opening tag: `<qd>`, mandatory.

Closing tag: `</qd>`, mandatory.

A quotation is an exact reproduction or paraphrase of a part of a document. A block or displayed quotation is a quotation that is set off from the rest of the text, without quotation markers, and usually in a different font (size) or indented or both. A displayed quotation consists of one or more paragraphs. See the relevant typesetting instructions for the journal concerned for details about the presentation of this element.

4.4 Enunciations

Opening tag: `<enun>`, mandatory.

Closing tag: `</enun>`, mandatory.

Enunciations are the catch-all phrase we have given to a special category of structuring elements that occurs quite often in, for instance, mathematical papers. Examples of such elements are “Theorem”, “Proof” and “Definition”. Syntactically, an enunciation consists of an optional `no` element (the identifying name of the enunciation), an optional title (`st`), and one or more paragraphs. The `enun` element has an optional `id` attribute that is used for cross-referencing.

For example,

Theorem 1 (*Main theorem*). The dynamic programming ...

would be marked up as

```
<enun id="enun1"><no>Theorem 1</no><st>Main theorem
<p>The dynamic programming ...
```

Since it is impossible to define a fixed list of theorem types, e.g. “Theorem”, “Proof”, “Definition” etcetera, the type must be given explicitly in the `no` element.

4.5 Cross-reference

Opening tag: `<cross-ref>`, mandatory.

Closing tag: `</cross-ref>`, mandatory.

Contents: text.

A cross-reference is a reference to an element in the same document instance. For presentation purposes the contents of the element can be used. The (mandatory) `refid` attribute specifies a list of one or more identifiers. Each identifier corresponds to an object in the document instance.

This element is used instead of `figr`, `tblr`, etc. of the releases up to article DTD 3.0.0. The most prominent change is that the fixed text that was previously generated, e.g. “Fig.”, is now *included* in the SGML document, *within* the `cross-ref` element, and is not implied by a style-sheet. This implies that the presentation of the cross-reference is more or less *fixed*: it can only be manipulated as a whole, or by the use of search-and-replace patterns.

The `cross-ref` element allows one-to-many mappings, i.e. from a single `cross-ref` element to two or more objects.¹

Some elementary examples:

```
See Table 4 for ...
See Figs. 4 and 5 for ...
See Plate IV for ...
See [1,5] for ...
Smith et al. (1996) showed ...
In (Smith et al., 1996, Lemma 5) it ...
According to Theorem A.5 we ...
Defluorinations of 197 were ...

See <cross-ref refid="tbl4">Table 4</cross-ref> for ...
See <cross-ref refid="fig4 fig5">Figs. 4 and 5</cross-ref> for ...
See <cross-ref refid="pla4">Plate IV</cross-ref> for ...
See <cross-ref refid="bib1 bib5">[1,5]</cross-ref> for ...
<cross-ref refid="bib24">Smith et al. (1996)</cross-ref> showed ...
In <cross-ref refid="bib24">(Smith et al., 1996, Lemma 5)</cross-ref> it ...
According to <cross-ref refid="thea5">Theorem A.5</cross-ref> we ...
Defluorinations of <cross-ref refid="fx26"><b>197</b></cross-ref> were ...
```

Some examples of “merged references”:

```
In Tables 2, 4–6 and 13 it ...
(Jansen, 1908a, b; Smith, 1987, 1988; Jones, 1990)

In <cross-ref refid="tbl2 tbl4 tbl5 tbl6 tbl13">Tables 2,
4&ndash;6 and 13</cross-ref> it ...
<cross-ref refid="bib21 bib22 bib91 bib93 bib28">(Jansen,
1908a, b; Smith, 1987, 1988; Jones, 1990)</cross-ref> ...
```

4.6 Number

Opening tag: `<no>`, mandatory.

Closing tag: `</no>`, mandatory.

Contents: text.

Many of the objects that can be the target of a cross-reference (`cross-ref`) can have a number element. This is used for capturing the label – the number (and often a prefix that indicates the object type) – as assigned to the object by the author of the document.

```
<fig id="fig4"><no>Fig. 4</no>...</fig>
<fig id="fig5"><no>Fig. 5a&ndash;c</no>...</fig>
<fig id="dia17"><no>Diagram Q</no>...</fig>
<fig id="plal1"><no>Plate XI</no>...</fig>
<enun><no>Lemma 4.3</no>...</enun>
<fn id="fn2"><no>2</no>...</fn>
<tblfn id="tblfn2"><no>**</no>...</tblfn>
<fd id="fd3"><no>(2&prime;)</no>...</fd>
<sec id="sec37"><no>4.1.1</no>...</sec>
<app id="app1"><no>Appendix A</no>...</app>
<bib id="bib7"><no>[7]</no>...</bib>
<bib id="bib18"><no>Goldfarb, 1990</no>...</bib>
```

The type text, e.g. “Fig”, is tagged together with the identifier, e.g. “5a–c”. The presentation style of the `no` element depends on the stylesheet. For instance, the `no` element of an enunciation will typically be printed in boldface, while footnotes will be printed superior. This facilitates the re-use of the content of the `no` element in other products. (This should be contrasted with the `cross-ref` element.)

The `no` element may not be empty. If the `no` element is present then it specifies the label of the parent element in the way explained above. If the `no` element is absent then this means that the parent element has no label, e.g. an unnumbered section.²

1. This use of `cross-ref`, with a list of two or more identifiers is allowed, but should be used with care. Presentation of, and navigation through, cross-references that do not point to a single target can be quite cumbersome, especially in electronic media.

2. No automatic numbering of elements takes place.

Special mention must be made of name/date references. Since these references not normally have a label, it would be natural to leave out the `no` elements. Consider, however, the example “Jansen, 1908a,b” in section 4.6: if there is no `no` element, it will be impossible to generate the “a” and “b” in 1998a and 1908b in the `bib` element itself. The `date` element does not contain this suffix. For this reason we suggest that name/date references are given a `no` element with a content of the form “Jansen, 1908a” and “Jansen, 1908b”, respectively. The style sheets of journals that contain name/date references would have to include that the `no` element is treated in a special way: only the part after the comma appears in print (after the author’s names).

4.7 Link

Opening tag: `<link>`, mandatory.

Closing tag: none.

Contents: none.

A `link` element specifies that a local external object, i.e. an object that is under control of the publisher, should be “inserted” at this point in the document. An example is an external file with a piece of artwork.

The `link` is an element that is declared empty, i.e. it has only a start tag `<link>` and no end tag. It has one attribute element, `locator`, which is a reference to an external object that is under control of the publisher. This object contains the actual table or figure, for example, in some appropriate format.

As an example example, take an article with a figure that contains `<link locator="gr1">`. Then the entity is declared in the document subtype as in figure 3.2 and the catalog file could be as in appendix B.

4.8 Intra-document reference

Opening tag: `<intra-ref>`, mandatory.

Closing tag: `</intra-ref>`, mandatory.

The `intra-ref` element is an intra-document reference, in other words a reference to an external object that is under control of the publisher. The `intra-ref` element has three attributes: `refid`, `locator`, and `object-type`.

The `locator` attribute specifies the target document, i.e. an external object. It is an ENTITY so it can point to the external object through the catalog file (see appendix B). The `object-type` attribute specifies the type of target document; this can have the values `preprint`, `embase`, `geobase` or `inspec`. The optional `refid` attribute specifies the identifier of an object within the target document.

As an example, take an article with a text box which is a subdocument (see 4.15). A reference to Section I within the text box could be marked up as follows:

```
... see <intra-ref locator="sbl" refid="secl">Section I
      in Box A</intra-ref> ...
```

while the entity declaration and the catalog file could look like the ones in figure 3.2 and appendix B.

4.9 Inter-document reference

Opening tag: `<inter-ref>`, mandatory.

Closing tag: `</inter-ref>`, mandatory.

The `inter-ref` element is an inter-document reference, in other words a reference to an external object that is *not* under control of the publisher. The `inter-ref` element has four attributes: `refid`, `locator`, `locator-type` and `object-type`.

The `locator` attribute specifies the target document, i.e. an external object. It can be, for example, a URL, a URN, or a preprint number. The `locator-type` attribute specifies the type of locator used; this can have the values `url`, `urn`, `xxx-archive`, `cern` or `fiz`. The `object-type` attribute specifies the type of target document referred to; this can have the values `preprint`, `embase`, `geobase` or `inspec`. The optional `refid` attribute specifies the identifier of an object within the target document.

A simple example is given below.

```
<p>A demo of the tour structure mechanism is available on the
<inter-ref locator="http://www4.informatik.uni-erlangen.de/Perplex/"
locator-type="url">Perplex homepage</inter-ref>...</p>
```

In presentation one can decide to print the value of the `locator` attribute, or to suppress it. For example, on conversion to HTML, the attribute would not be displayed, but would be used as the `href` attribute of the (HTML) `<a>` tag. The optional `refid` can be used for the part of the `href` attribute that appears after the `#`.

A more elaborate example, showing the use of `inter-ref` in bibliographic references, is given in section 3.6.3.2. Since the `inter-ref` cannot span multiple structural elements, it is impossible in this example to let `inter-ref` span complete `author` elements. In presentation one could therefore decide to assign a special interpretation to empty `inter-ref` elements that occur in `author` elements, e.g. use the entire `author` element as the begin point of a hypertext link.

4.10 List

Opening tag: `<l>`, mandatory.

Closing tag: `</l>`, mandatory.

A list consists of an optional number (`no`), an optional heading (`st`), and one or more list items. The start tag `<l>` has one required attribute, `type`, that specifies the type of the list: `ord` for ordered (numbered), `unord` for unordered (un-numbered, bulleted) or `tab` for no item label, but only indentation (tabbing). An example is given below:

```
<l type=unord>
<li><p>Two-center models.
<li><p>The Folded Yukawa Potential.
<li><p>Generalized Woods&ndash;Saxon potentials.
</l>
```

This could be displayed as, for example

- Two-center models.
- The Folded Yukawa Potential.
- Generalized Woods–Saxon potentials.

In analogy with the sectional units, a recursive list structure has been implemented; see section 3.5.2. The presentation of lists is determined only by the `type` attribute and the nesting level. See the relevant typesetting instructions for the journal concerned for details about the presentation of this element.

4.10.1 List item

Opening tag: ``, mandatory.

Closing tag: ``, optional.

A list item contains one or more paragraphs.

4.11 Definition list

Opening tag: `<dl>`, mandatory.

Closing tag: `</dl>`, mandatory.

The definition list is a variation of the regular list. A definition list consists of an optional number (`no`) containing the definition list's identifier (if any), an optional heading (`st`), and one or more list items. Each list item consists of a definition term, `dt`, and an optional definition description, `dd`. The `dt` element consists of text, and has one optional attribute `id`, which is used for cross-references. The `dd` element consists of one or more paragraphs.

An example is given below:

```
<dl>
<dt>United States<dd><p>Dollar
<dt>France<dd><p>Franc
<dt>Japan<dd><p>Yen
</dl>
```

This could be displayed as, for example

United States Dollar
France Franc
Japan Yen

4.12 Table

Opening tag: `<tbl>`, mandatory.

Closing tag: `</tbl>`, mandatory.

A table consists of an optional number element (containing the name of the table), an optional caption, and one or more table bodies or links to external entities. Table footnotes can occur anywhere within the table. A table can be the target for cross-reference by means of `cross-ref`.

The tag `<tbl>` does not generate a reference in the text. This must be generated with the tag `<cross-ref>`. If the value of the optional attribute `loc` is `float`, also the default value, the table is assumed to be a ‘floating’ table; a floating table is placed on the current page when possible, and otherwise on one of the next pages, depending on the algorithms of the processing application. If the value of this attribute is `display` it is a displayed table, which should be inserted at precisely the point in the document instance where it occurs, but on a line by itself.

The table has an identifier, which is given by the attribute `id`, and which can be referenced with `<cross-ref>`. The caption of a table consists of one or more paragraphs of text.

The body of a table can be regarded as a rectangular object, consisting of cells arranged in rows and columns. In the DTD it is described as consisting of rows, where each row consists of cells.

A table body (`tblbody`) consists of one or more rows (`r`), and has four attributes that determine the column and row stubs.³ The attributes are

- `top-stubs` is the number of rows, counted from the top of the table, that constitute the top column stubs;
- `left-stubs` is the number of columns, counted from the left-hand side of the table, that constitute the left row stubs;
- `bottom-stubs` is the number of rows, counted from the bottom of the table, that constitute the bottom column stubs;
- `right-stubs` is the number of columns, counted from the right-hand side of the table, that constitute the right row stubs.

Column (row) stubs are repeated when the table is split across a page along a horizontal (vertical) line.

A table row (`r`) consists of one or more columns or *cells* (`c`). All rows must be of equal length. In principle, every cell can have the same content as a paragraph of text. Individual cells can be empty, but also entire rows or columns.

In an abstract sense a cell consists of three parts:

1. the actual contents of the cell, i.e. the “inside” of the cell,
2. a border of white space around the contents, which we will call the “gutter” of the cell here,
3. the perimeter of the cell, which consists of four edges, namely the top, left, bottom and right edges.

Syntactically, a table cell consist of four border specifications, `top-border`, `left-border`, `bottom-border`, `right-border`, and the actual cell content. It has the following attributes:

- `cspan`, the number of spanned columns.
- `rspan`, the number of spanned rows.
- `ca`, the column alignment. Legal values of this attribute are `l` (left), `c` (center), `r` (right), `d` (decimal), `j` (justified), and `vmk` (vertical markers present; see explanation below). The default value is `l`.
- `ra`, the row alignment. Legal values of this attribute are `t` (top), `m` (middle), `b` (bottom) and `vj` (justified). Default value is `t`.

The four empty elements `top-border`, `left-border`, `bottom-border`, `right-border`, define the borders of the cell. Each element has an attribute `type` and an attribute `style`, which together specify the type of rule. The legal values of the `style` attribute of these four elements is given in table 4.3.

The legal values of the `type` attribute of `top-border` and `bottom-border` are given in table 4.1. The legal values of the `type` attribute of `left-border` and `right-border` are given in table 4.2.

An example of table markup, and one possibility of representing it, is given in figure 4.1.

3. The term “stub” is explained in the Chicago Manual of Style [4], although only column stubs are described there.

Table 4.1: Legal values of attributes that specify a horizontal line or other horizontal ornament. Horizontal ornaments may occur in `bottom-border`, `top-border`, `ov`, `ovl`, `un`, and `unl`.

Attribute value	Symbol	Attribute value	Symbol
bar	—	circ	⤿
tcub	⤿	tilde	⤿
bcub	⤿	rarr	→
tsqb	⊐	larr	←
bsqb	⊑	harr	↔
tpar	⤿	lharu	↙
bpar	⤿	rharu	↘

Table 4.2: Legal values of attributes that specify a vertical line or other vertical ornament. Vertical ornaments may occur in `left-border`, `right-border` and `cp`.

Attribute value	Symbol	Attribute value	Symbol
lpar	(bsol	\
rpar)	lceil	⌈
lsqb	[rceil	⌋
rsqb]	lfloor	⌊
lcub	{	rfloor	⌋
rcub	}	dharr	⤵
vb		uharr	⤴
lang	<	darr	↓
rang	>	uarr	↑
sol	/	varr	↕

Table 4.3: Values of the `style` attribute. The `style` attribute may occur in `top-border`, `bottom-border`, `left-border`, `right-border`, `box`, `cp`, `fr`, `ov`, `ovl`, `un` and `unl`.

Value	Meaning	Example
s	single	
d	double	
t	triple	
da	dashed	⋯
dot	dotted	⋮
b	bold	I
bl	blank	space between
n	none	no space between

Table 4.4: Meaningful combinations of `type` and `style` attributes. All other horizontal and vertical `types` may only occur in combination with `s`, `b` or `bl`.

type		style							
		s	d	t	da	dot	b	bl	n
<code>lpar</code>	<code>(</code>	×	×				×	×	
<code>rpar</code>	<code>)</code>	×	×				×	×	
<code>lsqb</code>	<code>[</code>	×	×				×	×	
<code>rsqb</code>	<code>]</code>	×	×				×	×	
<code>vb</code>	<code> </code>	×	×	×	×	×	×	×	×
<code>lang</code>	<code><</code>	×	×				×	×	
<code>rang</code>	<code>></code>	×	×				×	×	
<code>bar</code>	<code>—</code>	×	×	×	×	×	×	×	×

4.12.1 Vertical mark

Opening tag: `<vmk>`, mandatory.

Closing tag: none.

Within a column of a table, one can have alignment points indicated by a tag `<vmk>`. Within a cell one can have as many alignment points as one needs, but only if its horizontal alignment is specified as `vmk`.

4.12.2 Caption

Opening tag: `<caption>`, mandatory.

Closing tag: `</caption>`, optional.

A caption describes the contents of the parent element as a whole, and consists of one or more paragraphs.

4.12.3 Table body

Opening tag: `<tblbdy>`, mandatory.

Closing tag: `</tblbdy>`, optional.

For a more detailed discussion of the internal structure of the table body and of the attributes associated with it, see above.

4.12.4 Table footnote

Opening tag: `<tblfn>`, mandatory.

Closing tag: `</tblfn>`, mandatory.

A table footnote consists of an optional number and one or more paragraphs. Table footnote can be the target for cross-reference by means of `cross-ref`. The `id` attribute is required for this element. It is assumed that all cross-references to a table footnote occur in the same table as the table footnote.

4.13 Inline figure

Opening tag: `<inline-fig>`, mandatory.

Closing tag: `</inline-fig>`, mandatory.

This element consists of exactly one `link` element. An in-line figure, should be inserted at precisely the point in the document instance where it occurs.

```

<tblbdy top-stubs="1">
  <r>
    <c><top-border><bottom-border>Platinum precursor</c>
    <c><top-border><bottom-border>Metal loading(%)</c>
    <c><top-border><bottom-border>H<inf>2</inf>/&mu;mol g cat</c>
    <c><top-border><bottom-border>Pt surface area/m<sup>2</sup> gcat</c>
    <c><top-border><bottom-border>Pt dispersion(%)</c>
  </r>
  <r>
    <c>DNDA-Pt</c>
    <c ca="d">0.1</c>
    <c ca="d">1.02</c>
    <c ca="d">0.10</c>
    <c ca="d">39</c>
  </r>
  <r>
    <c>DNDA-Pt</c>
    <c ca="d">0.5</c>
    <c ca="d">5.40</c>
    <c ca="d">0.52</c>
    <c ca="d">42</c>
  </r>
  <r>
    <c><bottom-border>DNDA-Pt</c>
    <c ca="d"><bottom-border>1</c>
    <c ca="d"><bottom-border>10.6</c>
    <c ca="d"><bottom-border>1.02</c>
    <c ca="d"><bottom-border>41</c>
  </r>
</tblbdy>

```

Platinum precursor	Metal loading(%)	H ₂ /μmol g cat	Pt surface area/m ² gcat	Pt dispersion(%)
DNDA-Pt	0.1	1.02	0.10	39
DNDA-Pt	0.5	5.40	0.52	42
DNDA-Pt	1	10.6	1.02	41

Figure 4.1: Example of table markup and presentation.

4.14 Figure

Opening tag: <fig>, mandatory.

Closing tag: </fig>, mandatory.

A figure consists of an optional number (containing the name of the figure, e.g. ‘Fig. 1’, ‘Plate IV’, ‘Diagram A’), an optional caption, and one or more links to external entities (figure bodies) or nested figures (i.e. sub-figures). The elements `link` and `figure` may occur in any order, they may all be repeated and they may be mixed. For example:

- `figure-link1 figure-link2 figure-link3`
- `figure1 figure-link1 figure2 figure-link2`

are all well-structured figures.

The tag <fig> does not generate a reference in the text. This must be generated with <cross-ref>. If the value of the optional attribute `loc` is `float`, also the default value, the figure is assumed to be a ‘floating’ figure; a floating figure is placed on the current page when possible, and otherwise on one of the next pages, depending on the algorithms of the processing application. If the value of this attribute is `display` it is a displayed figure, which should be inserted at precisely the point in the document instance where it occurs, but on a line by itself.

The figure has an identifier, which is given by the attribute `id`, and which can be referenced with `cross-ref`.

4.15 Text-box

Opening tag: `<textbox>`, mandatory.

Closing tag: `</textbox>`, mandatory.

A text-box starts with an optional number and an optional caption. The rest of the text-box is either a link, or a sequence of paragraphs or sections (similar to the body of the article). For example, a text-box that includes a complete (short) article uses a `link` element that refers to a complete SGML document.

The `textbox` element has attributes `id` and `loc`, similar to `fig`.

4.16 Unprinted item

Opening tag: `<upi>`, mandatory.

Closing tag: `</upi>`, mandatory.

A `upi` element consists of an optional number, an optional caption, and one or more links or nested unprinted items. It is used to refer to entities that are under control of the publisher, but that are not displayed in the printed version of the article (except perhaps in the form of a list of available unprinted items). The unprinted items can be shown in electronic products that incorporate the article.

The `upi` element has attributes `id` and `loc`, similar to `figure`.

4.17 Formula

4.17.1 Inline formula

Opening tag: `<f>`, mandatory.

Closing tag: `</f>`, mandatory.

In theory, an inline formula consists of text, just like a paragraph. However, in most cases an inline formula will contain a high proportion of mathematical constructions, such as e.g. fractions, roots and summations. It is not allowed to have displayed formulas appear inside inline formulas.

Most of the details of presentation of formula contents depend on the chosen medium and layout. See the relevant typesetting instructions for the journal concerned for details about in-line formulas. Some details, however, can be described independent of these factors.

- Inside displayed and in-line formulas, Latin and Greek letters are slanted by default.
- Multiple spaces in the document instance always count as one, i.e. also within formulas.
- Line-breaking, for example in the form of discretionary multiplication signs (\times), is not indicated in the document. One exception is formed by the occurrence of the entity ` ;`, which indicates a non-breaking space.

4.17.2 Displayed formula

Opening tag: `<fd>`, mandatory.

Closing tag: `</fd>`, mandatory.

A displayed formula has the same content, apart from the optional number element, as an in-line formula, but it differs in presentation. See the relevant typesetting instructions for the journal concerned for details about the presentation of displayed formulas.

A displayed formula that consists of one single line is not special in any way. The only thing that can be said about it is that it can carry an identification, usually a number, which is given by the `id` attribute. This number can also be used for referring to the formula with `<cross-ref>`. A displayed formula carries a number if and only if it has an `id` attribute.

A displayed formula can also consist of multiple formula lines. This is tagged as an `fd` element with nested `fd` elements, one for each line in the formula. In that case both the formula as a whole, the ‘formula group’, and the individual formula lines can carry a number. The formula lines are tagged by nested start tags `<fd>` and end tags `</fd>`. Nested `fd` elements, i.e. formula lines, are not treated differently in presentation, i.e. they are not indented horizontally or set off from the main body of the text by vertical space.

4.18 Elements for built-up text

Elements for built-up text are structures used in (mathematical) formulas. An example is the element `rad`, which is used to mark up roots. The use of these structures is rather complex and is covered below.

4.18.1 Superiors and inferiors

Superiors and inferiors are indicated with the tags `sup` and `inf`, respectively. Examples:

Element	Meaning	Sample input	Sample output
<code>sup</code>	superior	<code><f>x<sup>2</sup></f></code>	x^2
<code>inf</code>	inferior	<code><f>y<inf>k</inf></f></code>	y_k

Multiple consecutive `sup` and `inf` elements are allowed. There could be a slight difference in presentation between `a¹²` and `a¹²`.

The elements `sup` and `inf` have attributes `loc` and `arrange`.

The first attribute can have values ‘pre’ (base element follows this element) and ‘post’ (base element precedes this element, default). So for example τ_{ij}^n should be marked up as follows

```
<sup loc=pre>&ast i</sup>&tau i<sup>n</sup><inf>ij</sup>
```

The second attribute is `arrange`. If this is absent, the superior or inferior should be placed as usual, i.e. as close as possible to the base element. If the attribute is present, it can (for the time being) only have the value `staggered`. An example will perhaps illustrate the concept of ‘staggering’: $T^1_2^3$ would be marked up as follows

```
T<sup>1</sup><inf arrange="staggered">2</inf>
<sup arrange="staggered">3</sup>
```

4.18.2 Accent constructions

The accent construction, start tag `<a>` and end tag ``, is as in the AAP DTD’s [6]. The element `a` consists of two sub-elements `ac`. The first sub-element is the accented character (*one* character only), and the second sub-element is the accent (*one* accent or mark only), which most often is an entity reference for a floating accent, e.g. `ˆ` for the circumflex accent.

The start tag `<a>` has an attribute `valign`, which can have the values `u` (up, accent above character, default), `m` (middle, accent strikes through character), and `d` (down, accent below character). Both the start tag and the end tag of `a` are mandatory. The start tag and end tag of its sub-elements, `ac`, are optional, but sufficient tags must be present to make the division in accented character and actual accent unambiguously clear.

Some examples are given in the table below:

Construct	Sample input	Sample output
‘Up’ accent	<code><a><ac>e<ac>&uml i</code>	\ddot{e}
‘Down’ accent	<code><f><ac>x<ac>&macr i</f></code>	\underline{x}
Two accents	<code><f><a><ac><a><ac>x<ac>&tilde i<ac>&macr i</f></code>	$\tilde{\bar{x}}$

4.18.3 Boxes, overlines and underlines

Constructs that are embellished with boxes, overlines and underlines are tagged as shown in the following example:

Tag name	Meaning	Sample input	Sample output
<code>box</code>	box	<code><f><box>a+b</box></f></code>	$\boxed{a+b}$
<code>ovl</code>	overline	<code><f><ovl type=bar>a+b</ovl></f></code>	$\overline{a+b}$
<code>unl</code>	underline	<code><f><unl type=bar>a+b</unl></f></code>	$\underline{a+b}$

These elements have one common optional attribute `style`. The elements `ovl` and `unl` also have a required mandatory attribute `type`. This attribute can have the values given in table 4.1.

The `style` attribute can have the values given in table 4.3, and specifies the style of line drawn around, above, respectively below the enclosed material. The default value of this attribute is `s` (single). This attribute is shared with the `fr` element (fraction), where it determines the style of the line (bar) drawn between numerator and denominator, and in the separator attributes of tables and table cells.

The mechanism for creating overlined and underlined elements only works when these constructs are properly nested. If non-nested constructs occur, these should be indicated with the tags given in the table below:

Construct	Start tag	End tag
Overline	<code><ov type=bar id="ABC"></code>	<code><ovr refid="ABC"></code>
Underline	<code><un type=bar id="XYZ"></code>	<code><unr refid="XYZ"></code>

For example: `<ov id="A">a+b<ovr id="A">` will create the same output as `<ovl>a+b</ovl>`. Another example: `<ovl>WX<un id="B">Y</ovl>Z<unr id="B">` should result in $\overline{WXY}Z$.

4.18.4 Limit constructions

A limits construct is composed of a main symbol, the operator (element `op`), a lower limit (element `ll`), and an upper limit (element `ul`). The lower and upper limits are optional, but the operator is mandatory. The operand is not identified as such by means of tags. For example,

$$\bigcup_{k=1}^n x_n \cup y_n$$

would be marked up as follows

```
<fd>
<lim>&cup;<ll>k=1<ul>n</lim>x<inf>n</inf>&cup;y<inf>n</inf>
</fd>
```

The size of the operator and the positioning of the lower and upper limits depend on the context in which the `lim` construction appears. For example: in the denominator of a built-up fraction within a displayed formula, the operator symbol is small. Summations, products and integrals are special forms of limit constructions, which differ only in the choice of the operator.

4.18.5 Fences

Characters such as parentheses `()`, square brackets `[]`, or curly braces `{}`, that are used to set off parts of a formula, are collectively called fences. They are added as a construct here in order to enable automatic adjustment of their height to match the dimensions of the material between the fences. The delimiting symbol is specified by the `cp` element (fence post), which can appear at the begin or end of the fence construction, or any number of times inside the fence construction.

There should be at least one `cp` element in each fence construction.

The details are as follows: the tags `<fen>` and `</fen>` do not generate any output themselves, but only delimit a *scope*. All delimiter symbols that occur within this scope should be tagged as `<cp>`. The height of a delimiter is the height of the fence of the same scope as the delimiter. The height of the fence is determined by the maximum height and depth of the contents of that fence construction.

The `cp` element is declared empty, i.e. it has no content and therefore no end-tag. It has two attributes, `type` and `style`. The `type` attribute is required and can have the values given in table 4.2. The `style` attribute is optional and can have the values given in table 4.3; the default value of this attribute is `s`. It should be noted that not all combinations of these two attributes make sense; table 4.4 shows all meaningful combinations.

An example:

$$\langle \psi | H | \psi' \rangle$$

would be marked up as follows

```
<f><fen>
<cp type=lang>&psi;<cp type=vb>H<cp type=vb>&psi;&prime;<cp type=rang>
</fen></f>
```

4.18.6 Fractions

A fraction consists of two parts, a numerator and a denominator. Since both elements are required, and the numerator always comes first, it is permitted to omit the start tag and the end tag of the numerator, and add only the start tag for the denominator. The simplest form of a fraction construct therefore is (unless the numerator is empty of course) `<fr>numerator<de>denominator</fr>`.

An example:

$$\frac{2x + 3y}{12x - 12y}$$

would be marked up as

```
<f><fr>2x+3y<de>12x&minus;12y</fr></f>
```

The fraction bar itself is not tagged: it is implicit. The alignment of numerator and denominator with respect to the fraction bar, the type of fraction, and the type of fraction bar can be indicated by attributes on the start tag of the fraction construct. The first such attribute is `shape`, which can have values 'case', 'built' (built-up, the default value) and 'sol' (solidus). The size of the fraction depends on the context (small inside in-line formulas, large inside displayed formulas.) See the table below for examples:

Shape	Sample input	Sample output
case	<code><f><fr shape=case>1<de>2</fr></f></code>	$\frac{1}{2}$
built	<code><f><fr shape=built>2x<de>3y</fr></f></code>	$\frac{2x}{3y}$
sol	<code><f><fr shape=sol>2x<de>3y</fr></f></code>	$2x/3y$

The second attribute of the fraction construct is the `align` attribute, which can have values 'l' (left), 'c' (center, default) or 'r' (right). This indicates the type of alignment of numerator and denominator with respect to the fraction bar. The third and last attribute of the fraction construct is the `style` attribute, which has values and attached meanings as given in table 4.3 on page 35, and which specifies the 'style' of the fraction bar.

4.18.7 Radical

Radicals, or roots, are composed of a radicand and an optional index. Since the radicand element, start tag `<rcd>`, is required and always comes first, it is allowed to omit its start tag and end tag. If the index is needed, only the start tag `<rdx>` is required. The following table gives some simple examples of radical (root) constructions:

Sample input	Sample output
<code><f><rad>2</rad></f></code>	$\sqrt{2}$
<code><f><rad><rcd>a+b</rad></f></code>	$\sqrt{a+b}$
<code><f><rad>a+b<rdx>3</rad></f></code>	$\sqrt[3]{a+b}$

4.18.8 Arrays

An array (element `ar`) is a rectangular scheme, consisting of one or more rows. Each row consists of one or more cells. In principle, each cell can have the same content as a paragraph of text, but in practice the content will usually be a formula (small or large), or empty. See the table constructions for an in-depth discussion of this construct and its attributes. There is no *a priori* difference between tables and arrays, and there are no precise rules as to when to use one or the other. In combination with fences the array construct can be used to create matrices, for example:

```
<fd>
<fen><cp type=lpar><ar>
<r><c>x<c>&minus;y
<r><c>y<c>x
</ar><cp type=rpar></fen>
</fd>
```

results in the following output:

$$\begin{pmatrix} x & -y \\ y & x \end{pmatrix}$$

4.18.9 Miscellaneous

4.18.9.1 Horizontal and vertical space

Should the need arise to indicate explicitly the insertion of wide or thin spaces, which can be the case, for example, in displayed mathematical formulas, there is a mechanism in the DTD to indicate horizontal or vertical spacing. For this one uses the elements `hsp` or `vsp`, which do not have content and therefore no corresponding end tag. The start-tags `<hsp>` and `<vsp>` have one attribute, `sp`, which has a numerical value.

For the `hsp` element, the value of the `sp` attribute is the number of “em’s” that needs to be inserted (default: 1.0), where one “em” is the width of the capital letter ‘M’ in the current font. For the `vsp` element, the spacing is in terms of the baseline-to-baseline distance.

Some remarks about details of vertical space:

- If `<vsp sp=1.5>` occurs in running text, e.g. in the middle of a sentence, this should be displayed as follows: move down by 1.5 “baseline skip”, and do not start on a new line.
- Extra vertical spacing between rows in a table is obtained by placing `vsp` elements in one cell of the table.

4.18.9.2 Arrow

The arrow element is not used at present.

4.19 Font changes

All tags for font change enclose text. The opening tag changes the base font, and the mandatory closing tag returns the font to the original base font.

Therefore all opening and closing tags for font changes are mandatory. In order to obtain “To change **text to bold**, and revert to roman”, one would use the `` and `` tags as in the following example:

To change `text to bold`, and revert to roman...

In principle, font changes can be embedded, e.g.

...`<it>`tags enclose `text</it>`. The ...

which would be printed as

...tags enclose **text**. The ...

However, not all combinations of font changes that are theoretically possible produce meaningful or useful results. For a detailed discussion of this issue see [11].

The font changes that are defined by the DTD are given in table 4.5. They can be used anywhere in the document, with one exception, namely `<rm>`, which can only be used in formulas. In normal text, all letters, latin and greek, have the default shape ‘upright’ (‘roman’). In most journals, all letters inside formulae, latin and greek, have the default shape ‘slanted’ (‘italic’). Therefore, the font change `<rm>` is used in formulas only, to generate letters or words in roman font. It is useless in normal running text, since running text is printed in a roman font by default.

Table 4.5: Font changes.

Tag name	Meaning	Sample input	Sample output
b	boldface	P (x)	P (x)
it	italic	<it>any</it>	<i>any</i>
of	openface	<of>Z</of>	\mathbb{Z}
sc	script	<sc>L</sc>	\mathcal{L}
ge	german	<ge>g</ge>	g
ssf	sans-serif	<ssf>A</ssf>	A
ty	typewriter	<ty>var</ty>	var
scp	small caps	<scp>Goldfarb</scp>	GOLDFARB
rm	roman	<f>N<inf><rm>white</rm></inf></f>	N_{white}

Appendix A

Future enhancements

The following topics, dealing with possible additions or modifications to the present version of the DTD, are currently under investigation:

1. Chemical formulas. Definitions for chemical formulas are not included in the DTD. In the present version of the DTD, chemical formulas should be included in an article as illustrations.
2. Commutative diagrams.
3. Alignment in displayed mathematical formulas.
4. Unicode compatibility.

During design of the DTD we strived for maximum compatibility with other standards. Efforts have been made to achieve compatibility in naming conventions with the AAP¹ DTD ([6], now made obsolete by the new ISO standard 12083, [7]) or with the MAJOUR DTD, developed by the European Working Group on SGML. Whenever the DTD is modified, we will attempt to maintain or achieve this compatibility.

1. AAP stands for 'Association of American Publishers'.

Appendix B

Entity management

From the December 1996 releases onwards, we propose that users of the DTDs defined in these release will use catalog files for entity management. This has been defined in [10].

An example catalog is given below. Please compare with figure 3.2 where example entity declarations are shown for the entities used in the article (occurring possibly in the `locator` attributes of `link` and `intra-ref`, and the `picture` attribute of `vt`). Compare also section 4.8.

```
SGMLDECL "art410.dcl"  
PUBLIC "-//ES//DTD full length article DTD version 4.1.0//EN" "art410.dtd"  
PUBLIC "-//ES//ENTITIES special characters version 4.0.1//EN" "chars401.ent"  
ENTITY "sb1" "sb1/tx1.gml"  
ENTITY "gr1" "gr1.tif"  
ENTITY "gr2" "gr2.jpg"  
ENTITY "aul" "signall.au"
```

Appendix C

SGML declaration

The document type definitions described in this report do not conform to the Reference Concrete Syntax [3]. The first difference is that the 'base set' of the concrete syntax is ASCII, not ISO 646:1983. In practice, this means that the dollar sign is used instead of the currency sign.

Furthermore, in order to be able to parse the present version of the DTDs, several quantities under the heading SYNTAX in the Reference Concrete Syntax must be changed. For example, the quantity GRPGTCNT must be increased from 96 to 238 for the article DTD, and the quantity NAMELEN must be increased to 17 to accommodate the names of some of the more recent elements and attribute values.

Since there is no clear algorithm for computing capacity points, and since capacity points depend on the document instance, we have decided to use the reference declaration of these parameters. If necessary for a particular document and application, a custom declaration can be derived from the ones we include with the present release, and use this customized declaration instead.

The SGML declarations to be used with the present version of the DTDs are distributed together with the DTDs, in separate files. Each DTD has its own declaration. The SGML declaration for the article DTD is printed below.

Although this declaration permits the use of various forms of minimization, current practice within Elsevier Science is to use no minimization, except possible omission of start tags, end tags and optional attributes, where these can be inferred by an SGML parser. Semi-colons must be used to delimit entity references. Processing instructions are not allowed. SGML comments are allowed.

```
<!SGML "ISO 8879:1986"

CHARSET
  BASESET      "ISO 646:1983//CHARSET International Reference Version (IRV)//ESC 2/5 4/0"
  DESCSET      0 9 UNUSED
               9 2 9
               11 2 UNUSED
               13 1 13
               14 18 UNUSED
               32 95 32
               127 1 UNUSED

CAPACITY
  PUBLIC       "ISO 8879:1986//CAPACITY Reference//EN"

SCOPE
  DOCUMENT

SYNTAX
  SHUNCHAR     CONTROLS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
               18 19 20 21 22 23 24 25 26 27 28 29 30 31 127
  BASESET      "ISO 646:1983//CHARSET International Reference Version (IRV)//ESC 2/5 4/0"
  DESCSET      0 128 0
  FUNCTION      RE 13
               RS 10
               SPACE 32
               TAB SEPCHAR 9
  NAMING       LCNMSTRT " "
               UCNMSTRT " "
               LCNMCHAR "-."
               UCNMCHAR "-."
               NAMECASE      GENERAL YES
                               ENTITY NO
```

DELIM	GENERAL SGMLREF
	SHORTREF SGMLREF
NAMES	SGMLREF
QUANTITY	SGMLREF
	NAMELEN 17
	LITLEN 718
	GRPCNT 238
	GRPGTCNT 154
	ATTCNT 240
	TAGLVL 100
FEATURES	
MINIMIZE	DATATAG NO
	OMITTAG YES
	RANK NO
	SHORTTAG YES
LINK	SIMPLE NO
	IMPLICIT NO
	EXPLICIT NO
OTHER	CONCUR NO
	SUBDOC YES 100
	FORMAL YES
APPINFO	
NONE>	

Appendix D

Document type definition for articles

```
<!-- Elsevier Science Full Length Article DTD version 4.1.0

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provided this notice is included in all copies, but changing it is not allowed.

Typical invocation:
<!DOCTYPE art PUBLIC "-//ES//DTD full length article DTD version 4.1.0//EN" []>
-->

<!-- notations -->

<!NOTATION TEXT PUBLIC "-//ES//NOTATION text format//EN">
<!NOTATION IMAGE PUBLIC "-//ES//NOTATION image format//EN">
<!NOTATION AUDIO PUBLIC "-//ES//NOTATION audio format//EN">
<!NOTATION VIDEO PUBLIC "-//ES//NOTATION video format//EN">
<!NOTATION APPLICATION PUBLIC "-//ES//NOTATION application format//EN">

<!-- data entities -->

<!ENTITY % font-change "(b|it|rm|of|sc|ge|ssf|ty|scp)" >
<!ENTITY % inline "(f|sup|inf|a|ovl|ov|ovr|unl|un|unr|lim|fen|box|fr|rad|ar|
    arrow|hsp|vsp|inline-fig)" >
<!ENTITY % display "(fd|tbl|fig|textbox|upi|l|dl|qd|enun)" >
<!ENTITY % data "(#PCDATA|%font-change;|%inline;|%display;|fn|anchor|
    cross-ref|intra-ref|inter-ref)*" >

<!-- content model entities -->

<!ENTITY % name "( snm, fnm?, jr? )" >
<!ENTITY % text "( p | sec )+" >
<!ENTITY % titles "( ( title, translated-title? ) | translated-title )" >

<!-- attribute type entities -->

<!ENTITY % abs-class "(author|editor|inspec|teaser)" >
<!ENTITY % accent-pos "(u|m|d)" >
<!ENTITY % arrange "(staggered)" >
<!ENTITY % cpyrt-type "(full-transfer|limited-transfer|no-transfer|unknown|us-gov|
    crown|society|other|joint)" >
<!ENTITY % docsubty "(abs|add|adv|ann|brv|cal|cnf|cor|dis|edi|err|fla|lit|mis|nws|
    pnt|prp|prv|pub|rev|sco|ssu)" >
<!ENTITY % fr-align "(l|c|r)" >
<!ENTITY % halign "(l|c|r|j|d|vmk)" >
<!ENTITY % hline "(bar|tcub|bcub|tsqb|bsqb|circ|tilde|larr|rarr|harr|
    lharu|rharu|tpar|bpar)" >
<!ENTITY % iso639 "(aa|ab|af|am|ar|as|ay|az|ba|be|bg|bh|bi|bn|bo|br|ca|co|cs|...)" >
<!ENTITY % iso3166 "(ad|ae|af|ag|ai|al|am|an|ao|aq|ar|as|at|au|aw|az|ba|bb|...)" >
<!ENTITY % kwd-class "(kwd|abr|jel|msc|pacs|mat|src|idt|psycinfo|neurosci|
    inspec-cc|inspec-ct|inspec-chi)" >
<!ENTITY % language "(de|en|es|fr|pt|ru)" >
<!ENTITY % list-type "(ord|unord|tab)" >
<!ENTITY % loc "(pre|post)" >
<!ENTITY % location "(display|float)" >
<!ENTITY % locator-type "(url|urn|xxx-archive|cern|fiz)" >
```

```

<!ENTITY % object-type "(preprint|embase|geobase|inspec)" >
<!ENTITY % shape "(built|case|sol)" >
<!ENTITY % style "(s|d|t|da|dot|b|bl|n)" >
<!ENTITY % valign "(t|m|b|vj)" >
<!ENTITY % vline "(lpar|rpar|lsqb|rsqb|lcub|rcub|lang|rang|vb|sol|bsol|lceil|rceil|
lfloor|rfloor|dharr|uharr|darr|uarr|varr)" >

<!-- article -->

<!ELEMENT      art          - o          ( copyright, dochead?, doctopic?, fm?, bdy?, bm? )>
<!ATTLIST     art
version       NUTOKEN          #FIXED "4.1.0"
jid           NMTOKEN          #REQUIRED
aid           NMTOKEN          #REQUIRED
pii           NMTOKEN          #IMPLIED
docsubty     %docsubty;       fla
language      %language;      en
refers-to    NMTOKEN          #IMPLIED>

<!-- copyright -->

<!ELEMENT      copyright   - o          ( %data; )>
<!ATTLIST     copyright
type          %cpyrt-type;    #REQUIRED
yr           NUMBER          #REQUIRED>

<!-- document header, e.g. "Short Communication" -->

<!ELEMENT      dochead     - o          ( %data; )>

<!-- document topic, e.g. "Particle Physics" -->

<!ELEMENT      doctopic    - o          ( %data; )>

<!-- article front matter -->

<!ELEMENT      fm          - o          ( atlfn*, atl*, prs?, ded?, aug*, re?, rv*, acc?,
misc?, abs*, kwdg*, nomenclature? )>
<!ELEMENT      atlfn       - o          ( p+ )>
<!ELEMENT      atl         - o          ( %data;, sbt? )>
<!ATTLIST     atl
language      %language;      #IMPLIED>
<!ELEMENT      sbt         - o          ( %data; )>
<!ELEMENT      prs         - o          ( %data; )>
<!ELEMENT      ded         - o          ( %data; )>
<!ELEMENT      aug         - o          ( ( ( collab | au ), cross-ref*, cor?, ead* )+,
aff* )>
<!ELEMENT      collab     - -          ( index?, %data;, caff? )>
<!ELEMENT      caff       - o          ( %data; )>
<!ELEMENT      au         - -          ( degs?, ( fnm? & snm ), jr?, degs?, roles? )>
<!ELEMENT      degs       - o          ( %data; )>
<!ELEMENT      fnm        - o          ( inits?, %data; )>
<!ELEMENT      inits      - -          ( %data; )>
<!ELEMENT      snm        - o          ( index?, %data; )>
<!ELEMENT      index      - -          ( %data; )>
<!ELEMENT      jr         - o          ( %data; )>
<!ELEMENT      roles      - o          ( %data; )>
<!ELEMENT      cor        - o          ( %data; )>
<!ELEMENT      ead        - o          ( %data; )>
<!ELEMENT      aff        - o          ( no?, %data;, ( cty, %data; )?, cny, %data; )>
<!ATTLIST     aff
id            ID              #IMPLIED>
no           - -              ( %data; )>
cty         - -              ( %data; )>
cny         - -              ( %data; )>
<!ATTLIST     cny
cny-code     %iso3166;       #IMPLIED>
re           - o              EMPTY>
<!ATTLIST     re
day          NUMBER          #REQUIRED
mo           NUMBER          #REQUIRED
yr           NUMBER          #REQUIRED>

```

```

<!ELEMENT rv - o EMPTY>
<!ATTLIST rv
  day NUMBER #REQUIRED
  mo NUMBER #REQUIRED
  yr NUMBER #REQUIRED>
<!ELEMENT acc - o EMPTY>
<!ATTLIST acc
  day NUMBER #REQUIRED
  mo NUMBER #REQUIRED
  yr NUMBER #REQUIRED>
<!ELEMENT misc - o ( %data; )>
<!ELEMENT abs - o ( %text; )>
<!ATTLIST abs
  class %abs-class; #IMPLIED
  language %language; #IMPLIED>
<!ELEMENT p - o ( %data; )>
<!ELEMENT kwdg - o ( kwd+ )>
<!ATTLIST kwdg
  class %kwd-class; kwd
  language %language; #IMPLIED>
<!ELEMENT kwd - - ( %data;, kwd* )>
<!ELEMENT nomenclature - o ( dl+ )>

<!-- article body -->
<!ELEMENT bdy - o ( salutation?, %text; )>
<!ELEMENT salutation - o ( %data; )>
<!ELEMENT sec - - ( no?, st?, %text; )>
<!ATTLIST sec
  id ID #IMPLIED>
<!ELEMENT st - o ( %data; )>

<!-- article back matter -->
<!ELEMENT bm - o ( ack?, appm?, bibl*, further-reading*,
  glossary*, vt* )>

<!-- acknowledgement -->
<!ELEMENT ack - o ( p+ )>

<!-- bibliography -->
<!ELEMENT bibl - o ( st?, bib+ )>
<!ELEMENT bib - o ( no?, ( bb | other-ref ) )>
<!ATTLIST bib
  id ID #IMPLIED>
<!ELEMENT bb - o ( contribution?, host+ )>
<!ELEMENT contribution - o ( authors?, (%titles;)?, comment? )>
<!ATTLIST contribution
  language %iso639; #IMPLIED>
<!ELEMENT authors - o ( collab | ( author, et-al? ) )>
<!ELEMENT author - o ( %name; )>
<!ELEMENT et-al - o EMPTY >
<!ELEMENT title - o ( %data;, sbt? )>
<!ELEMENT translated-title - o ( %data;, sbt? )>
<!ELEMENT comment - o ( %data; )>
<!ELEMENT host - o ( ( issue | book | edited-book | e-host ),
  comment? )>
<!ELEMENT issue - o ( editors?, (%titles;)?, conference?,
  series, issue-nr?, date, pages? )>
<!ELEMENT conference - o ( %data; )>
<!ELEMENT editors - o ( editor+, et-al? )>
<!ELEMENT editor - o ( %name; )>
<!ELEMENT series - o ( (%titles;), volume-nr? )>
<!ELEMENT volume-nr - o ( %data; )>
<!ELEMENT issue-nr - o ( %data; )>
<!ELEMENT date - o ( %data; )>
<!ELEMENT pages - o ( first-page, last-page? )>
<!ELEMENT first-page - o ( %data; )>
<!ELEMENT last-page - o ( %data; )>
<!ELEMENT book - o ( (%titles;)?, edition?, book-series?, date+,

```

```

        publisher? )>
<!ELEMENT      edition      - o      ( %data; )>
<!ELEMENT      publisher    - o      ( name, location? )>
<!ELEMENT      name         - o      ( %data; )>
<!ELEMENT      location     - o      ( %data; )>
<!ELEMENT      edited-book  - o      ( editors?, (%titles;)?, conference?, edition?,
        book-series?, date+, pages?, publisher? )>
<!ELEMENT      book-series  - o      ( editors?, series )>
<!ELEMENT      e-host       - o      ( inter-ref?, date? )>
<!ELEMENT      other-ref    - o      ( %data; )>

<!-- further reading -->

<!ELEMENT      further-reading - o      ( st?, bib+ )>

<!-- appendix -->

<!ELEMENT      appm         o o      ( app+ )>
<!ELEMENT      app          - o      ( no?, st?, %text; )>
<!ATTLIST      app          id          ID          #IMPLIED>

<!-- glossary -->

<!ELEMENT      glossary     - o      ( st?, glossary-entry+ )>
<!ELEMENT      glossary-entry - -      ( glossary-heading, glossary-def*, cross-ref*,
        glossary-entry* )>
<!ATTLIST      glossary-entry id          ID          #IMPLIED>
<!ELEMENT      glossary-heading - -      ( %data;, glossary-heading* )>
<!ELEMENT      glossary-def  - -      ( %data; )>

<!-- vita -->

<!ELEMENT      vt           - o      ( p+ )>
<!ATTLIST      vt           id          ID          #IMPLIED
        picture      ENTITY      #IMPLIED>

<!-- footnote -->

<!ELEMENT      fn           - -      ( no?, p+ )>
<!ATTLIST      fn           id          ID          #REQUIRED>

<!-- anchor in text, the target of e.g. a cross-ref -->

<!ELEMENT      anchor       - -      ( %data; )>
<!ATTLIST      anchor       id          ID          #REQUIRED>

<!-- displayed quotation -->

<!ELEMENT      qd           - -      ( p+ )>

<!-- enunciation -->

<!ELEMENT      enun         - -      ( no?, st?, p+ )>
<!ATTLIST      enun         id          ID          #IMPLIED>

<!-- reference to objects in this document -->

<!ELEMENT      cross-ref    - -      ( %data; )>
<!ATTLIST      cross-ref    refid      IDREFS      #REQUIRED>

<!-- embedded reference to local external entity, e.g. in FIG -->

<!ELEMENT      link         - o      EMPTY>
<!ATTLIST      link         locator     ENTITY      #REQUIRED>

```

```

<!-- reference to local external entity -->

<!ELEMENT      intra-ref      - -          ( %data; )>
<!ATTLIST     intra-ref
              refid           NAME          #IMPLIED
              locator         ENTITY       #REQUIRED
              object-type     %object-type; #IMPLIED>

<!-- reference to global external entity -->

<!ELEMENT      inter-ref      - -          ( %data; )>
<!ATTLIST     inter-ref
              refid           NAME          #IMPLIED
              locator         CDATA        #IMPLIED
              locator-type    %locator-type; #IMPLIED
              object-type     %object-type; #IMPLIED>

<!-- list -->

<!ELEMENT      l              - -          ( no?, st?, li+ )>
<!ATTLIST     l
              id              ID           #IMPLIED
              type            %list-type;  #REQUIRED>
<!ELEMENT      li             - o          ( p+ )>

<!-- definition list -->

<!ELEMENT      dl             - -          ( no?, st?, ( dt, dd? )+ )>
<!ATTLIST     dl
              id              ID           #IMPLIED>
<!ELEMENT      dt             - o          ( %data; )>
<!ATTLIST     dt
              id              ID           #IMPLIED>
<!ELEMENT      dd             - o          ( p+ )>

<!-- table -->

<!ELEMENT      tbl             - -          ( no?, caption?, ( link | tblbdy )+ ) +( tblfn )>
<!ATTLIST     tbl
              id              ID           #IMPLIED
              loc              %location;   float>
<!ELEMENT      caption        - o          ( p+ )>
<!ELEMENT      tblbdy         - o          ( r+ )>
<!ATTLIST     tblbdy
              top-stubs      NUMBER     0
              left-stubs     NUMBER     0
              bottom-stubs   NUMBER     0
              right-stubs    NUMBER     0>
<!ELEMENT      r              - o          ( c+ )>
<!ELEMENT      c              - o          ( top-border?, left-border?, bottom-border?,
              right-border?, %data; ) +( vmk )>
<!ATTLIST     c
              cspan          NUMBER     1
              rspan          NUMBER     1
              ca              %halign;    1
              ra              %valign;    t>

<!ELEMENT      top-border     - o          EMPTY>
<!ATTLIST     top-border
              type            %hline;    bar
              style          %style;     s>

<!ELEMENT      left-border    - o          EMPTY>
<!ATTLIST     left-border
              type            %vline;    vb
              style          %style;     s>

<!ELEMENT      bottom-border  - o          EMPTY>
<!ATTLIST     bottom-border
              type            %hline;    bar
              style          %style;     s>

```

```

<!ELEMENT      right-border      - o          EMPTY>
<!ATTLIST     right-border
  type         %vline;          vb
  style        %style;          s>

<!-- vertical mark, only allowed in cell data and only if ca="vmk" -->

<!ELEMENT      vmk                - o          EMPTY>

<!-- table footnote -->

<!ELEMENT      tblfn              - -          ( no?, p+ )>
<!ATTLIST     tblfn
  id           ID                 #REQUIRED>

<!-- inline figure -->

<!ELEMENT      inline-fig         - -          ( link )>

<!-- figure -->

<!ELEMENT      fig                - -          ( no?, caption?, ( link | fig )+ )>
<!ATTLIST     fig
  id           ID                 #IMPLIED
  loc          %location;         float>

<!-- text box or SGML sub-document -->

<!ELEMENT      textbox            - -          ( no?, caption?, ( link | %text; ) )>
<!ATTLIST     textbox
  id           ID                 #IMPLIED
  loc          %location;         float>

<!-- unprinted item -->

<!ELEMENT      upi                - -          ( no?, caption?, ( link | upi )+ )>
<!ATTLIST     upi
  id           ID                 #IMPLIED
  loc          %location;         float>

<!-- displayed formula -->

<!ELEMENT      fd                 - -          ( no?, %data; )>
<!ATTLIST     fd
  id           ID                 #IMPLIED>

<!-- inline formula -->

<!ELEMENT      f                  - -          ( %data; ) -( fd )>

<!-- built-up text, uses <r> from <tbl> -->

<!ELEMENT      sup                - -          ( %data; )>
<!ATTLIST     sup
  loc          %loc;              #IMPLIED
  arrange      %arrange;          #IMPLIED>
<!ELEMENT      inf                - -          ( %data; )>
<!ATTLIST     inf
  loc          %loc;              #IMPLIED
  arrange      %arrange;          #IMPLIED>
<!ELEMENT      a                  - -          ( ac, ac )>
<!ATTLIST     a
  valign       %accent-pos;       u>
<!ELEMENT      ac                 o o          ( %data; )>
<!ELEMENT      ovl                - -          ( %data; )>
<!ATTLIST     ovl
  type         %hline;            #REQUIRED
  style        %style;            s>
<!ELEMENT      ov                 - o          EMPTY>
<!ATTLIST     ov
  id           ID                 #REQUIRED

```

```

type %hline; #REQUIRED
style %style; s>
<!ELEMENT ovr - o EMPTY>
<!ATTLIST ovr
refid IDREF #REQUIRED>
<!ELEMENT unl - - ( %data; )>
<!ATTLIST unl
type %hline; #REQUIRED
style %style; s>
<!ELEMENT un - o EMPTY>
<!ATTLIST un
id ID #REQUIRED
type %hline; #REQUIRED
style %style; s>
<!ELEMENT unr - o EMPTY>
<!ATTLIST unr
refid IDREF #REQUIRED>
<!ELEMENT lim - - ( op, ll?, ul? )>
<!ELEMENT op o o ( %data; )>
<!ELEMENT ll - o ( %data; )>
<!ELEMENT ul - o ( %data; )>
<!ELEMENT fen - - ( %data;, ( cp, %data; )+ )>
<!ELEMENT cp - o EMPTY>
<!ATTLIST cp
type %vline; #REQUIRED
style %style; s>
<!ELEMENT box - - ( %data; )>
<!ATTLIST box
style %style; s>
<!ELEMENT fr - - ( nu, de )>
<!ATTLIST fr
shape %shape; built
align %fr-align; c
style %style; s>
<!ELEMENT nu o o ( %data; )>
<!ELEMENT de - o ( %data; )>
<!ELEMENT rad - - ( rcd, rdx? )>
<!ELEMENT rcd o o ( %data; )>
<!ELEMENT rdx - o ( %data; )>
<!ELEMENT ar - - ( r+ )>
<!ELEMENT arrow - - ( %data; )>
<!ELEMENT hsp - o EMPTY>
<!ATTLIST hsp
sp NUTOKEN "1.0">
<!ELEMENT vsp - o EMPTY>
<!ATTLIST vsp
sp NUTOKEN "1.0">

<!-- font change -->

<!ELEMENT b - - ( %data; )>
<!ELEMENT it - - ( %data; )>
<!ELEMENT of - - ( %data; )>
<!ELEMENT sc - - ( %data; )>
<!ELEMENT ge - - ( %data; )>
<!ELEMENT ssf - - ( %data; )>
<!ELEMENT ty - - ( %data; )>
<!ELEMENT scp - - ( %data; )>
<!ELEMENT rm - - ( %data; )>

<!-- character set -->

<!ENTITY % es-chars PUBLIC "-//ES//ENTITIES special characters version 4.0.1//EN">
%es-chars;

```

Appendix E

Changes with respect to the previous version

The following changes were made to the document type definitions.

1. Updated the opening comment in order to reflect the new version
2. Updated the value of the `version` attribute of `art` to 4.1.0
3. Updated the public identifier of `%es-chars`;
4. Changed the model of `authors` (was ambiguous)
5. Made `fm` in `art` optional (could be empty)
6. Made the end-tags of `inits`, `index`, `no au`, `collab` and `glossary-def` required (clarification)
7. Renamed the parameter entity `%country`; to `iso3166`; (clarification)
8. Changed the attribute value `psychinfo` to `psycinfo` in `%kwd-class`; (CR 129)
9. Changed `FORMAL NO` to `FORMAL YES` in the SGML declaration (CR 130)
10. Changed all public identifiers to formal public identifiers (CR 130)
11. Changed the attribute value `za` to `cd` in `%country`; (CR 131)
12. Changed the model of `atlfm` to `p+` (CR 132)
13. Added three keyword classes to `%kwd-class`; (CR 133)
14. Changed the use and documentation of the `no` element (CR 134)
15. Removed elements `scheme` and `plate` (see CR 134)
16. Added the attribute value `joint` to `%cpyrt-type`; (CR 137)
17. Changed `*` to `+` in the models of `fig`, `tbl` and `upi` (CR 141)
18. Changed the model of `upi` in order to allow nesting (see CR 141)
19. Added the attribute values `tpar` and `bpar` to `%hline`; (CR 142)
20. Added the attribute values `dharr`, `uharr`, `darr`, `uarr` and `varr` to `%vline`; (CR 142)
21. Added parameter entity `%iso639`; for the ISO 639 language codes (CR 144)
22. Changed the language attribute of `title` to `%iso639`; (CR 144)
23. Moved language attribute from `title` to `contribution` (see CR 144)
24. Added new value `fiz` to `%locator-type`; (CR 145)
25. Added new value `inspec` to `%object-type`; (CR 145)
26. Made the end tags of `glossary-entry` and `glossary-heading` mandatory (CR 146)
27. Added the attribute value `brv` to `%docsubty`; (CR 147)

The entity declarations of all special characters can be found in the file `chars401.ent`. Please note that no significant changes were made to the entity list: only the opening comment has been updated and the following changes have been applied (CR 138 has not been implemented).

1. Added entities `lozf` and `z.ltril`
2. Changed entity `z.creps` to `z.crepsv`
3. Changed entity `z.reveps` to `z.repsiv`
4. Changed entity `z.invr` to `z.pinvr`
5. Removed entities `z.pcaph`, `z.psmca`, `z.psmcb`, `z.psmce`, `z.psmcg`, `z.psmci`, `z.psmcn`, `z.psmcr`, `z.psmcu` and `z.psmcy`

Appendix F

ISO 3166 country list

This appendix gives a description of the two-letter country codes based on International Standard ISO 3166. The attribute `cny-code` of the element `cny` takes values in this list; it is used to uniquely identify the country.

cny-code	Full name	cny-code	Full name
ad	Andorra	cu	Cuba
ae	United Arab Emirates	cv	Cape Verde
af	Afghanistan	cx	Christmas Island
ag	Antigua and Barbuda	cy	Cyprus
ai	Anguilla	cz	Czech Republic
al	Albania	de	Germany
am	Armenia	dj	Djibouti
an	Netherlands Antilles	dk	Denmark
ao	Angola	dm	Dominica
aq	Antarctica	do	Dominican Republic
ar	Argentina	dz	Algeria
as	American Samoa	ec	Ecuador
at	Austria	ee	Estonia
au	Australia	eg	Egypt
aw	Aruba	eh	Western Sahara
az	Azerbaijan	er	Eritrea
ba	Bosnia & Hercegovina	es	Spain
bb	Barbados	et	Ethiopia
bd	Bangladesh	fi	Finland
be	Belgium	fj	Fiji
bf	Burkina Faso	fk	Malvinas
bg	Bulgaria	fm	Micronesia
bh	Bahrain	fo	Faroe Islands
bi	Burundi	fr	France
bj	Benin	ga	Gabon
bm	Bermuda	gb	UK
bn	Brunei	gd	Grenada
bo	Bolivia	ge	Georgia
br	Brazil	gf	French Guiana
bs	Bahamas	gh	Ghana
bt	Bhutan	gi	Gibraltar
bv	Bouvet Island	gl	Greenland
bw	Botswana	gm	Gambia
by	Byelorussia	gn	Guinea
bz	Belize	gp	Guadeloupe
ca	Canada	gq	Equatorial Guinea
cc	Cocos (Keeling) Islands	gr	Greece
cd	Democratic Republic Congo	gs	Sth Georgia and the Sth Sandwich Islands
cf	Central African Republic	gt	Guatemala
cg	Congo	gu	Guam
ch	Switzerland	gw	Guinea-Bissau
ci	Ivory Coast	gy	Guyana
ck	Cook Islands	hk	Hong Kong
cl	Chile	hm	Heard and Mc Donald Islands
cm	Cameroon	hn	Honduras
cn	People's Republic of China	hr	Croatia
co	Colombia	ht	Haiti
cr	Costa Rica	hu	Hungary

cny-code	Full name	cny-code	Full name
id	Indonesia	mt	Malta
ie	Ireland	mu	Mauritius
il	Israel	mv	Maldives
in	India	mw	Malawi
io	British Indian Ocean Territory	mx	Mexico
iq	Iraq	my	Malaysia
ir	Iran	mz	Mozambique
is	Iceland	na	Namibia
it	Italy	nc	New Caledonia
jm	Jamaica	ne	Niger
jo	Jordan	nf	Norfolk Island
jp	Japan	ng	Nigeria
ke	Kenya	ni	Nicaragua
kg	Kirgiziya	nl	Netherlands
kh	Cambodia	no	Norway
ki	Kiribati	np	Nepal
km	Comoros	nr	Nauru
kn	Saint Kitts and Nevis	nu	Niue
kp	North Korea	nz	New Zealand
kr	South Korea	om	Oman
kw	Kuwait	pa	Panama
ky	Cayman Islands	pe	Peru
kz	Kazakhstan	pf	French Polynesia
la	Laos	pg	Papua New Guinea
lb	Lebanon	ph	Philippines
lc	Saint Lucia	pk	Pakistan
li	Liechtenstein	pl	Poland
lk	Sri Lanka	pm	St. Pierre and Miquelon
lr	Liberia	pn	Pitcairn
ls	Lesotho	pr	Puerto Rico
lt	Lithuania	pt	Portugal
lu	Luxembourg	pw	Palau
lv	Latvia	py	Paraguay
ly	Libyan Arab Jamahiriya	qa	Qatar
ma	Morocco	re	Reunion
mc	Monaco	ro	Romania
md	Moldavia	ru	Russia
mg	Madagascar	rw	Rwanda
mh	Marshall Islands	sa	Saudi Arabia
mk	Macedonia	sb	Solomon Islands
ml	Mali	sc	Seychelles
mm	Burma	sd	Sudan
mn	Mongolia	se	Sweden
mo	Macau	sg	Singapore
mp	Northern Mariana Islands	sh	St. Helena
mq	Martinique	si	Slovenia
mr	Mauritania	sj	Svalbard and Jan Mayen
ms	Montserrat	sk	Slovak Republic

cny-code	Full name
sl	Sierra Leone
sm	San Marino
sn	Senegal
so	Somalia
sr	Suriname
st	Sao Tome and Principe
sv	El Salvador
sy	Syria
sz	Swaziland
tc	Turks and Caicos Islands
td	Chad
tf	French Southern Territories
tg	Togo
th	Thailand
tj	Tadzhikistan
tk	Tokelau
tm	Turkmenistan
tn	Tunisia
to	Tonga
tp	East Timor
tr	Turkey
tt	Trinidad and Tobago
tv	Tuvalu
tw	Taiwan
tz	Tanzania
ua	Ukraine
ug	Uganda
um	US Minor Outlying Islands
us	USA
uy	Uruguay
uz	Uzbekistan
va	Vatican City State
vc	St. Vincent and the Grenadines
ve	Venezuela
vg	British Virgin Islands
vi	US Virgin Islands
vn	Viet Nam
vu	Vanuatu
wf	Wallis and Futuna Islands
ws	Samoa
ye	Yemen
yt	Mayotte
yu	Minor Yugoslavia
zm	South Africa
zr	Zambia
zw	Zimbabwe

Appendix G

ISO 639 language list

This appendix gives a description of the two-letter languages codes from International Standard ISO 639. The attribute `language` of the element `contribution` takes values in this list; it is used to specify the language of the contribution.

Note that the `language` attribute of the elements `art`, `atl`, `abs` and `kwdg` take their values in the subset consisting of the six language codes `de`, `en`, `es`, `fr`, `pt` and `ru`.

language	Language	language	Language	language	Language
ab	Abkhazian	is	Icelandic	gd	Scots Gaelic
aa	Afar	in	Indonesian	sr	Serbian
af	Afrikaans	ia	Interlingua	sh	Serbo-Croatian
sq	Albanian	ie	Interlingue	st	Sesotho
am	Amharic	ik	Inupiak	tn	Setswana
ar	Arabic	ga	Irish	sn	Shona
hy	Armenian	it	Italian	sd	Sindhi
as	Assamese	ja	Japanese	si	Singhalese
ay	Aymara	jw	Javanese	ss	Siswati
az	Azerbaijani	kn	Kannada	sk	Slovak
ba	Bashkir	ks	Kashmiri	sl	Slovenian
eu	Basque	kk	Kazakh	so	Somali
bn	Bengali	rw	Kinyarwanda	es	Spanish
dz	Bhutani	ky	Kirghiz	su	Sudanese
bh	Bihari	rn	Kirundi	sw	Swahili
bi	Bislama	ko	Korean	sv	Swedish
br	Breton	ku	Kurdish	tl	Tagalog
bg	Bulgarian	lo	Laothian	tg	Tajik
my	Burmese	la	Latin	ta	Tamil
be	Byelorussian	lv	Latvian	tt	Tatar
km	Cambodian	ln	Lingala	te	Tegulu
ca	Catalan	lt	Lithuanian	th	Thai
zh	Chinese	mk	Macedonian	bo	Tibetan
co	Corsican	mg	Malagasy	ti	Tigrinya
hr	Croatian	ms	Malay	to	Tonga
cs	Czech	ml	Malayalam	ts	Tsonga
da	Danish	mt	Maltese	tr	Turkish
nl	Dutch	mi	Maori	tk	Turkmen
en	English	mr	Marathi	tw	Twi
eo	Esperanto	mo	Moldavian	uk	Ukranian
et	Estonian	mn	Mongolian	ur	Urdu
fo	Faeroese	na	Nauru	uz	Uzbek
fa	Farsi	ne	Nepali	vi	Vietnamese
fj	Fiji	no	Norwegian	vo	Volapuk
fi	Finnish	oc	Occitan	cy	Welsh
fr	French	or	Oriya	wo	Wolof
fy	Frisian	om	Oromo	xh	Xhosa
gl	Galician	ps	Pashto	ji	Yiddish
ka	Georgian	pl	Polish	yo	Yoruba
de	German	pt	Portuguese	zu	Zulu
el	Greek	pa	Punjabi		
kl	Greenlandic	qu	Quechua		
gn	Guarani	rm	Rhaeto-Romance		
gu	Gujarati	ro	Romanian		
ha	Hausa	ru	Russian		
iw	Hebrew	sm	Samoan		
hi	Hindi	sg	Sangro		
hu	Hungarian	sa	Sanskrit		

Appendix H

Character set

The character set is defined by entity references whose definitions can be found in a separate file `chars401.ent`. A typical definition looks like this:

```
<!ENTITY cup SDATA "&cup;">
```

For every entity ('symbol') in this list, an appropriate identification of the equivalent in the presentation system must be found.

Entity name	Meaning	Sample output
<code>&dagger;</code>	dagger symbol	†
<code>&AElig;</code>	A-E ligature	Æ
<code>&oplus;</code>	plus sign in circle	⊕
<code>&omega;</code>	Greek letter omega	ω

Two entities require some explanation.

- ` `: This entity does not correspond to a printable character. It functions as a non-breaking space, i.e. an inter-word space that cannot be used as a line-breaking point during hyphenation and justification (H&J).
- ` `: This entity is used for punctuation space, or thousand-separator, in large numbers. It can be represented, for instance, by a thin space or a comma, depending on the style.

The complete set of symbols used in all publications of Elsevier Science – is given in the *Handbook Procedures and Standards*, chapter 45.01.01. On the following three pages we reproduce the tables that contain this set of symbols; these tables, B, C and P, are often called the 'Elsevier Science Grid'.

The entity references for this character set are incorporated in one document that is referenced from the DTDs.

It is assumed that the characters RE, RS and TAB are never used in document instances, even though they are allowed by the SGML declaration, see appendix C. Multiple spaces count as one. The character (byte) values 32–126 are the only ASCII characters that can be used 'as is' in document instances, with the exception of the characters given below.

"	quotation mark, double quote	<code>&quot;</code>
&	ampersand	<code>&amp;</code>
<	less-than sign	<code>&lt;</code>

Following the Grid we include three tables that serve as indexes to the Grid. These tables give the Grid coordinates of the symbol, the name of the entity reference corresponding to the symbol, and a short description. The first index is sorted alphabetically on the entity names; the second one is sorted on the Grid coordinates. The Grid coordinates are used in the following way: the coordinates are given as a sequence of three letters, for example 'Bcd'. The entity with these coordinates can be found in table B, column c, row d.

Some of the cells in the grid do not contain an entity name, but an accent construction. We decompose certain glyphs in a letter and an accent for structural reasons (for information about this practice in the area of phonetics please refer to [5]). This does not mean that during presentation it always has to be *created* as such. It is well possible that for some letter-accent combinations there is a mapping to a position in a (virtual) font. This resembles the situation with ligatures,

e.g. the well-known ‘fi’ ligature. Structurally, we distinguish the letters ‘f’ and ‘i’ as being separate, but together they sometimes (depending on the font, and perhaps the position in the word) combine to a special glyph.

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		
a	↔	↘	↓	<	>	‡	‡	&	∇	∑	<	≠	>	≠	∈	∉	⊃	⊄	×	‡		a	
b	⇒	↘	↓	⌞	⌟			€	∃	∏	≠	≠	≠						x	‡		b	
c	↔	↗	↓	⌈	⌋	§		\$	∅	∏	≠		≠		∩	∩	∩	∩	·	±	€	c	
d	↔	↗	↓	⌈	⌋	¶		£	∩	∏	≠	≠	≠	≠	∩	∩	∩	∩	×	‡		d	
e	←	↗	↑			⊗		f		√	≠	≠	≠	≠		∩		∩	×	‡		e	
f	←	←	↑			↘	◇	¥	∩	∩	≠	≠	≠	≠		∩		∩	×	*		f	
g	←	↗	↑			◇	◇	ℙ	∩	∩	≠	≠	≠	≠	∩	∩	∩	∩	<		h	g	
h	←	↗	↑			◇	◇	∩	∩	∩	≠	≠	≠	≠	∩	∩	∩	∩	>		h	h	
i	↔		↗		‡	♥	♦	∩	S	≠	≠	≠	≠		∩		∩		∩			i	
j	↔	↗	↓		‡	♠		∩	∩	≠	≠	≠	≠	∩		∩						j	
k	↔	↗	↗		:	♣		∩	∩	≠	≠	≠	≠	∩	∩	∩	∩	⊕			∩	k	
l	↔	↗	↗		:	☆		∩	∩	≠		≠		∩	∩	∩	∩	⊖	-			l	
m	→	→	↕		:	★		%	∩	∩	≠		≠		∩	∩	∩	∩	∩	∩	∩	m	
n	⇒	⇒	↕		-	□	○	%	∩	∩	≠	∩	≠			∩	∩	∩	∩	∩	∩	n	
o	→				-	■	●		∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	o	
p	⇒	↻	↻	⊥		▣	▣		∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	p	
q	⇒	↻	↻	⊥		▣	▣		∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	q	
r	↔	↔	↕	⊥		▣	▣	©	∩		∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	r	
s	↔	↔	↕	⊥	∩	▣	▣	®	∩		∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	s	
t	↔		↕	⊥		▣	●	™	∩		∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	t	
u	↔		↕	⊥	∩	▣	●		∩	f	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	u	
v	←			⊥	∩	▣	●		∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	v	
w	→	↗	↗	⊥		▣	●	∩	∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	w	
x	→		↗	⊥	∩	▣	∩	∩	∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	x	
y	←		↗	⊥	∩	▣	∩	∩	∩	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	y	
z	↔		↗			▣		∩	f	∩	∩	∩	∩		∩	∩	∩	∩	∩	∩	∩	z	
1	→	↗	↕			△	△		∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	1	
2	↔	↗	↕			▽	▽		∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	2	
3	↔	↗		└	└	▽		∩	∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	3	
4		↗		└	└	△		∩	∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	4	
5		↗		└	└	▲		∩	∩	∩	∩	∩	∩		∩		∩	∩	∩	∩	∩	5	
6					+	▼	▣	∩		∩		∩		∩		∩		∩	∩	∩	∩	6	
7					#	▶	▣	∩	<	∩		∩		∩		∩		∩	∩	∩	∩	7	
8						▶	▣	∩	<	∩	*	*	∩		∩		∩		∩	∩	∩	8	
9						▶	▣	∩	<	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	∩	9
0								∩	>		*				∩		∩		∩		∩	0	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u		

Figure H.1: Grid table B: symbols

	A	B	C	D	E	F	G	H	I	J	
a	´	a	А	α	Λ	æ		⋈			a
b	`	б	Б	β	В	Æ		⌐		<i>B</i>	b
c	”	ц	Ц	χ	Х	ċ		⌒			c
d	^	д	Д	δ	Δ	Ð		λ			d
e	¨	е	Е	ε	Ε	œ	i				e
f		ф	Ф	φ	Φ	Œ					f
g	°	г	Г	γ	Γ						g
h	¸	х	Х	η	Н	ı				<i>H</i>	h
i	˘	и	И	ι	І	J					i
j	ˇ	я	Я	ϑ	Θ						j
k	ˇ	к	К	κ	К						k
l	¸	л	Л	λ	Λ	ł				<i>L</i>	l
m	ˉ	м	М	μ	М	Ł				<i>M</i>	m
n	•	н	Н	ν	N						n
o	•	о	О	ο	О	ø				<i>O</i>	o
p	…	п	П	π	Π	∅					p
q	…	ч	Ч	θ	Θ		ı				q
r		р	Р	ρ	Р						r
s		с	С	σ	Σ	ß					s
t		т	Т	τ	T						t
u		у	У	υ	У	ª					u
v		в	В	ς		º					v
w		щ	Щ	ω	Ω						w
x	¸	ш	Ш	ξ	Ξ						x
y	/	ы	Ы	ψ	Ψ						y
z	/	з	З	ζ	Z						z
1		э	Э		∇						1
2		і	І	ω	Ω						2
3		й	Й	ε							3
4		ь	Ь	φ							4
5		ю	Ю	Ϝ							5
6		ъ	Ъ	ð							6
7		ж	Ж	ϐ	<	>					7
8				κ	«	»					8
9				ϙ	‘	’					9
0				ι	“	”					0
	A	B	C	D	E	F	G	H	I	J	

Figure H.2: Grid table C: alphabets and accents

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	
a	á	æ	à	ä	æ	À	Λ	α													a
b	ḃ	Ḅ	ḅ																		b
c	č	ĉ	ċ	ċ	ċ																c
d	đ	ḍ	ḏ	ḏ	Ḑ	ḑ	Ḓ	Ḕ													d
e	ē	æ	ə	ē	E	ε	ɜ	ɝ	ɛ												e
f	f																				f
g	g	ĝ	G	γ	γ	G															g
h	h	ḥ	ḥ	ḥ	ḥ	H	Ḳ	Ḵ	Ḷ												h
i	í	î	ï	ï																	i
j	ĵ	Ĵ	ĵ	Ĵ																	j
k	k	ķ	ķ	ķ																	k
l	l	ł	ł	ł	ł	L	λ	λ													l
m	m	ṃ	ṃ	ṃ	M																m
n	n	ñ	ñ	ñ	N	η	ṇ														n
o	ó	⊙	ø	œ	Œ	ɔ	ω	ω	ɔ	ω											o
p	p	Ṗ	Ṗ	Ṗ																	p
q	q																				q
r	r	ṙ	ṙ	ṙ	Ṛ	Ṝ	Ṟ	Ṡ	Ṣ	Ṥ											r
s	s	š	š	š	š																s
t	t	ṭ	ṭ	ṭ	Ṭ	Ṩ	Ṫ														t
u	u	ṹ	ṹ	ṹ																	u
v	v	ṽ																			v
w	w	Ẃ																			w
x	x	Ẅ																			x
y	y	Ẇ	Ẇ																		y
z	z	Ẃ	Ẃ	Ẃ	Ẃ	Ẃ	Ẃ														z
0	?	?	?																		0
1	?	?	?	!		/	≠	≠				\									1
2	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	2
3	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ														3
4		ˆ																			4
5	ˆ	ˆ	ˆ																		5
6	ˆ	ˆ	ˆ	ˆ	ˆ																6
7	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ	ˆ											7
8	ˆ	ˆ																			8
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	

Figure H.3: Grid table P: phonetic alphabet and accents

Entity name	Description	Coordinate
<code>&acoint;</code>	contour integral, anti-clockwise	Bj1
<code>&acute;</code>	acute (accent)	CAa
<code>&aelig;</code>	ash (phonetic symbol)	Pea
<code>&AElig;</code>	ligature AE	CFb
<code>&aleph;</code>	Aleph (Hebrew)	CHa
<code>&alpha;</code>	alpha – Greek –	CDa
<code>&amalg;</code>	inverted prod. (conjunction); amalgamation, coprod	Bjd
<code>&amp;</code>	ampersand	Bha
<code>&and;</code>	logical and; small infinum; wedge	Bin
<code>&And;</code>	double infinum (conjunction); double logical and	Bir
<code>&ang;</code>	angle	Bk1
<code>&ang90;</code>	right (90 degree) angle; factorial sign	Bk5
<code>&angmsd;</code>	angle-measured	Bk2
<code>&angsph;</code>	spherical angle	Bk3
<code>&ap;</code>	approximate; asymptotic	Bq4
<code>&ape;</code>	approximate, equals; asymptotic or equal to	Bq5
<code>&apid;</code>	triple tilde; approximately identical to	Bq6
<code>&ast;</code>	mid asterisk	Bk8
<code>&asymp;</code>	cupcap; asymptotically equal to	Brs
<code>&Barwed;</code>	double bar wedge; log and, dbl bar	Biz
<code>&barwed;</code>	logical and, bar above; projective	Bix
<code>&bcong;</code>	reverse congruent	Bq9
<code>&bcy;</code>	beh – Cyrillic–	CBb
<code>&Bcy;</code>	Beh – Cyrillic –	CCb
<code>&becaus;</code>	because	Brt
<code>&beta;</code>	beta (phonetic symbol)	Pdb
<code>&beth;</code>	Beth (Hebrew)	CHb
<code>&bowtie;</code>	bowtie	Bsf
<code>&bprime;</code>	backprime; reverse prime	B15
<code>&breve;</code>	breve (accent)	CAj
<code>&brvbar;</code>	broken vertical bar	Ben
<code>&bsim;</code>	reverse mainline tilde; reverse similar	Bq7
<code>&bsime;</code>	reverse similar, equals	Bq8
<code>&bull;</code>	filled circle; bullet	Bgo
<code>&bump;</code>	bumpy equals; geometrically equiv. to; appr. equal	Brr
<code>&bumpe;</code>	bumpy equals, equals; approximately equal to	Brp
<code>&cap;</code>	prod. of intrsctn of cl./sets; vee; small intrsctn	Big
<code>&Cap;</code>	double intersection; (Cap)	Bii
<code>&caron;</code>	Hacek (Czech.), caron, wedge (accent)	CAk
<code>&ccoint;</code>	contour integral, clockwise	Bj2
<code>&cedil;</code>	cedilla (accent)	CAI
<code>&cent;</code>	cent sign	Bhb
<code>&check;</code>	check mark; tick	Bff
<code>&chi;</code>	chi (phonetic symbol)	Pbx
<code>&cir;</code>	circle, open	Bgn
<code>&circ;</code>	circumflex, Caret (accent)	CAd
<code>&cire;</code>	circle, equals	Bqn

Entity name	Description	Coordinate
<code>&clubs;</code>	clubsuit; club, filled	Bfk
<code>&Colon;</code>	four dots in square; as	Btt
<code>&colone;</code>	colon, equals; is defined as	Bqt
<code>&comp;</code>	stretched c (phonetic symbol)	Pec
<code>&compfn;</code>	centered circle; composite function; convolution	Bk9
<code>&cong;</code>	congruent with; similar to	Bq3
<code>&conint;</code>	contour integral; circuital integral	Bjv
<code>&coprod;</code>	inverted product (cumulator)	Bjc
<code>&copy;</code>	copyright sign (circled C)	Bhr
<code>&ctdot;</code>	triple dot, centered	Bn9
<code>&cuepr;</code>	curly equals (above), precedes	Bkv
<code>&cuesc;</code>	curly equals (above), succeeds	Bmv
<code>&cularr;</code>	left curved arrow; anti-clockwise arrow	Bcp
<code>&Cup;</code>	double union; (Cup)	Bih
<code>&cup;</code>	sum or union of classes or sets; logical sum	Bif
<code>&curarr;</code>	right curved arrow; clockwise arrow	Bcq
<code>&cuvee;</code>	curly logical or	Biv
<code>&cuwed;</code>	curly logical and	Biu
<code>&cwint;</code>	clockwise integral	Bj3
<code>&dagger;</code>	dagger	Bfa
<code>&Dagger;</code>	double dagger; diesis	Bga
<code>&daleth;</code>	Daleth (Hebrew)	CHc
<code>&dArr;</code>	down double arrow; implies	Bcd
<code>&darr;</code>	downward arrow; decreases	Bcc
<code>&darr2;</code>	two downward arrows	Bcu
<code>&dashv;</code>	dash, vertical; turnstile	Bdt
<code>&dblac;</code>	double acute (accent)	CAc
<code>&Dcy;</code>	Deh – Cyrillic –	CCd
<code>&dcy;</code>	deh – Cyrillic–	CBd
<code>&deg;</code>	degree sign	Bk7
<code>&delta;</code>	delta – Greek –	CDd
<code>&Delta;</code>	delta (capital); increment – Greek –	CEd
<code>&dharrl;</code>	down harpoon left	Bca
<code>&dharr;</code>	down harpoon right	Bcb
<code>&diam;</code>	diamond	Bfg
<code>&diams;</code>	diamondsuit; diamond, filled	Bfh
<code>&divide;</code>	division sign	Bto
<code>&divonx;</code>	division on times	Btf
<code>&dlcorn;</code>	down left corner	Bd3
<code>&dminus;</code>	minus with dot beneath; tight dotted minus	Btm
<code>&doplus;</code>	plus sign, dot below; tight dotted plus	Bta
<code>&dot;</code>	dot above (accent)	CAo
<code>&DotDot;</code>	quadruple dot (accent)	CAq
<code>&drcorn;</code>	down right corner	Be3
<code>&dtdot;</code>	triple dot, diagonal NW-SE	Bp9
<code>&dtri;</code>	down triangle open	Bf2
<code>&dtrif;</code>	down triangle, filled	Bf6

Entity name	Description	Coordinate
<code>&ecir;</code>	circle in equals sign	Bqs
<code>&ecolon;</code>	equals, colon; defines	Bqu
<code>&Ecy;</code>	Eh – Cyrillic –	CC1
<code>&ecy;</code>	eh – Cyrillic –	CB1
<code>&eDDot;</code>	equal, double dot above and under	Bqv
<code>&edot;</code>	equals, dot above; approaches the limit	Bqo
<code>&eDot;</code>	equals, even dots; approximately equal	Bqp
<code>&efDot;</code>	equals, falling dots; appr. equal to; image of	Bqz
<code>&egs;</code>	equal-or-greater, slanted	Bmc
<code>&ell;</code>	roman script-l	Buk
<code>&els;</code>	equal-or-less, slanted	Bkc
<code>&empty;</code>	slashed zero; empty set	Bu0
<code>&emptyv;</code>	solidus in circle; empty set; null set; diameter	Bs1
<code>&epsi;</code>	epsilon (Porson) – Greek –	CDe
<code>&epsiv;</code>	epsilon (phonetic symbol)	Pfe
<code>&quest;</code>	equal, questionmark	Bqm
<code>&equiv;</code>	equivalent; identical with; triple equals	Bqx
<code>&erDot;</code>	equal, rising dots	Bqy
<code>&esim;</code>	equal, similar	Bkp
<code>&eta;</code>	eta – Greek –	CDh
<code>&eth;</code>	eth (phonetic symbol)	Ped
<code>&ETH;</code>	ETH (phonetic symbol)	Pfd
<code>&exist;</code>	reversed cap. E; there exists; at least one exists	Bib
<code>&fcy;</code>	ef – Cyrillic–	CBf
<code>&Fcy;</code>	Ef – Cyrillic –	CCf
<code>&female;</code>	Venus; female	Bh4
<code>&flat;</code>	flat (music)	Bhw
<code>&forall;</code>	inverted capital A; for all	Bia
<code>&fork;</code>	pitchfork	Bm3
<code>&frown;</code>	down curve, frown	Bm2
<code>&Gamma;</code>	gamma (capital) – Greek –	CEg
<code>&gamma;</code>	gamma – Greek –	CDg
<code>&gammad;</code>	digamma	CD5
<code>&gap;</code>	greater than, approximately	Bmg
<code>&gcy;</code>	geh – Cyrillic–	CBg
<code>&Gcy;</code>	Geh – Cyrillic –	CCg
<code>&gdot;</code>	greater than, with dot	Bmo
<code>&ge;</code>	greater than or equal to	Bmd
<code>&gE;</code>	greater than or double equal to	Bme
<code>&gEl;</code>	greater, (double) equal, or less	Bmk
<code>&geli;</code>	greater, equal, or less	Bmj
<code>&ges;</code>	greater than or equal to, slanted	Bmb
<code>&Gg;</code>	much greater than (triple)	Bmn
<code>&gimel;</code>	Gimel (Hebrew)	CHd
<code>&gl;</code>	greater than or less than	Bmi
<code>&gnap;</code>	greater than but not approximate	Bng
<code>&gne;</code>	greater than, not equals to	Bnd

Entity name	Description	Coordinate
<code>&gnE;</code>	greater than but not (double) equal to	Bne
<code>&gnsim;</code>	greater than but not similar to	Bnf
<code>&grave;</code>	grave (accent)	CAb
<code>&gsim;</code>	greater than or similar to; greater than approx.	Bmf
<code>&Gt;</code>	much greater than (double)	Bml
<code>&HARDcy;</code>	Tvyordyy znak – Cyrillic –	CC6
<code>&hardcy;</code>	tyvordyy znak – Cyrillic–	CB6
<code>&harr;</code>	left-right arrow; mutually implies	Bar
<code>&harrw;</code>	left and right arrow-wavy	Bai
<code>&hearts;</code>	heartsuit; heart, filled	Bfi
<code>&hellip;</code>	triple dot	Bm9
<code>&hercon;</code>	hermitian conjugative matrix	Bte
<code>&homthr;</code>	homothetic	Bq0
<code>&Icy;</code>	Ee – Cyrillic –	CCi
<code>&icy;</code>	ee – Cyrillic–	CBi
<code>&iexcl;</code>	inverted exclamation mark (Spanish)	CGe
<code>&iff;</code>	left-right dbl arrow; if and only if; mut. implies	Bas
<code>&iiota;</code>	inverted iota – Greek –	CD0
<code>&imof;</code>	image of	Bop
<code>&infin;</code>	infinity sign	Blz
<code>&inodot;</code>	i, undotted (phonetic symbol)	Pei
<code>&int;</code>	integral operator	Bjp
<code>&intcal;</code>	intercal; true	Bdq
<code>&iota;</code>	iota (phonetic symbol)	Pci
<code>&iproduct;</code>	intprod	Bk6
<code>&iquest;</code>	inverted question mark (Spanish)	CGq
<code>&isin;</code>	set membership; member	Boa
<code>&jcy;</code>	ee kratkoyeh – Cyrillic–	CB3
<code>&Jcy;</code>	Ee kratkoyeh – Cyrillic –	CC3
<code>&jnodot;</code>	j, undotted (phonetic symbol)	Pfj
<code>&kappa;</code>	kappa – Greek –	CDk
<code>&kappav;</code>	kappa (cursive,rounded) – Greek –	CD8
<code>&Kcy;</code>	Kah – Cyrillic –	CCk
<code>&kcy;</code>	kah – Cyrillic–	CBk
<code>&khcy;</code>	tchek – Cyrillic–	CBq
<code>&KHcy;</code>	Tchek – Cyrillic –	CCq
<code>&lAarr;</code>	left triple arrow	Baq
<code>&Lambda;</code>	lambda (capital) – Greek –	CEl
<code>&lambda;</code>	lambda (phonetic symbol)	Pgl
<code>&lang;</code>	left angle bracket	Bda
<code>&lap;</code>	less than and double approximate	Bkg
<code>&laquo;</code>	open double guillemet; angle open quote	CE8
<code>&lArr;</code>	left double arrow; is implied by	Bah
<code>&Larr;</code>	two-head left arrow	Bav
<code>&larr;</code>	left arrow; relata of a relation	Bag
<code>&larr2;</code>	two left arrows	Bau
<code>&larrhk;</code>	left arrow-hooked	Bae

Entity name	Description	Coordinate
<code>&larrlp;</code>	left arrow, looped	Bbe
<code>&larrtl;</code>	left arrow-tailed	Bay
<code>&lceil;</code>	left ceiling; bottomless left bracket	Bd2
<code>&Lcy;</code>	El – Cyrillic –	CCl
<code>&lcy;</code>	el – Cyrillic–	CBl
<code>&ldot;</code>	less than, with dot	Bko
<code>&ldquo;</code>	double quotation mark, left	CE0
<code>&lE;</code>	less than or (double) equal	Bke
<code>&le;</code>	less than or equal	Bkd
<code>&lEg;</code>	less, (double) equal, or greater	Bkk
<code>&leg;</code>	less, equal, or greater	Bkj
<code>&les;</code>	less than or equal to, slanted	Bkb
<code>&lfisht;</code>	left fish tail	Bey
<code>&lfloor;</code>	left floor; topless left bracket	Bd1
<code>&lg;</code>	less than or greater than	Bki
<code>&lhard;</code>	left harpoon, down	Bbf
<code>&lharu;</code>	left harpoon-up	Baf
<code>&Ll;</code>	much less than (triple)	Bkn
<code>&lnap;</code>	less than but not approximate	Blg
<code>&lne;</code>	less than but not equals	Bld
<code>&lnE;</code>	less than but not (double) equal to	Ble
<code>&lnsim;</code>	less than, not similar	Blf
<code>&loang;</code>	left open angular bracket	Bdd
<code>&lbrk;</code>	left open bracket	Bdc
<code>&loz;</code>	lozenge open; total mark	Bgf
<code>&lozf;</code>	lozenge, filled	Bgi
<code>&lparlt;</code>	left parenthesis, less than	Bi7
<code>&lrarr2;</code>	left over right arrow; reversible reaction	Bac
<code>&lrhar2;</code>	left over right harpoon; reversible reaction	Baa
<code>&lsh;</code>	left hook arrow up	Bbw
<code>&lsim;</code>	less than or similar to; less, approximate	Bkf
<code>&lsquo;</code>	turned comma (phonetic symbol)	Pl2
<code>&lt;</code>	less than sign	Bka
<code>&Lt;</code>	much less than (double)	Bkl
<code>&lthree;</code>	left three times	Bsh
<code>&ltimes;</code>	times sign, left closed	Bsd
<code>&ltri;</code>	left triangle open	Bf4
<code>&ltrie;</code>	left triangle, equal	Btu
<code>&ltrif;</code>	left triangle, filled	Bf8
<code>&macr;</code>	overbar, macron (accent)	CAM
<code>&male;</code>	Mars; male	Bh7
<code>&malt;</code>	Maltese cross	Bfe
<code>&Map;</code>	two-head right arrow, ended	Bax
<code>&map;</code>	mapping; maps to	Bao
<code>&mcy;</code>	em – Cyrillic–	CBm
<code>&mdash;</code>	em dash, copymarked 1/M	Btr
<code>&mDDot;</code>	geometric properties	Btp

Entity name	Description	Coordinate
<code>&mid;</code>	divides; mid (Height of capital I)	Bdi
<code>&middot;</code>	center dot	Bsc
<code>&minus;</code>	minus sign	Btl
<code>&minusb;</code>	minus sign in box	Bs6
<code>&minusd;</code>	minus with dot above; symmetric difference	Btn
<code>&mnplus;</code>	minus or plus sign	Btd
<code>&mu;</code>	mu – Greek –	CDm
<code>&mumap;</code>	multimap	Boo
<code>&nabla;</code>	differential vector; nabla;	CE1
<code>&nap;</code>	not approximate; not asymptotic to	Br4
<code>&napid;</code>	not approximately, double; dashed triple tilde	Br6
<code>&natur;</code>	natural (music)	Bhy
<code>&nbspc;</code>	no break (required) space	Ba0
<code>&ncong;</code>	not congruent with; neither appr. nor act. equal	Br3
<code>&ncy;</code>	en – Cyrillic–	CBn
<code>&ndash;</code>	en dash (long hyphen), copymarked 1/N	Btq
<code>&ne;</code>	double-barred slash (phonetic symbol)	Ph1
<code>&nearhk;</code>	N-E arrow, hooked	Bbd
<code>&nearr;</code>	arrow, north-east; grows	Bck
<code>&nequiv;</code>	not equivalent, not identical with	Brx
<code>&nesear;</code>	N-E, S-E arrows	Bb2
<code>&nexist;</code>	not rev. cap. E; not exists; there does not exist	Bic
<code>&nge;</code>	not greater-than-or-equal	Bnj
<code>&ngE;</code>	not greater, double equals	Bnk
<code>&nges;</code>	neither greater than nor equal to, slanted	Bnb
<code>&ngt;</code>	not greater than	Bna
<code>&nhArr;</code>	not left-right dbl arrow; negation of mut. implies	Bbs
<code>&nharr;</code>	not left-right arrow	Bbr
<code>&ni;</code>	contains; owns; includes	Bqa
<code>&nlarr;</code>	not left arrow	Bbg
<code>&nlArr;</code>	not left double arrow; not implied by	Bbh
<code>&nle;</code>	not less, double equals	Blk
<code>&nle;</code>	not less-than-or-equal	Blj
<code>&nles;</code>	neither less than nor equal to, slanted	Blb
<code>&nlt;</code>	not less than	Bla
<code>&nltri;</code>	not left triangle	Bi4
<code>&nltrie;</code>	not left triangle, equals	Btw
<code>&nmid;</code>	not mid	Bei
<code>&not;</code>	logical not sign	Bro
<code>&notin;</code>	not an element of; is not a member of	Bpa
<code>&notni;</code>	does not contain as a member	Bra
<code>&npar;</code>	not parallel	Bej
<code>&npr;</code>	does not precede	Blq
<code>&npre;</code>	not precedes, equals	Blu
<code>&nrarr;</code>	not right arrow; does not tend to	Bbm
<code>&nrArr;</code>	not right double arrow; does not imply	Bbn
<code>&nrtri;</code>	not right triangle	Bi2

Entity name	Description	Coordinate
<code>&nrtrie;</code>	not right triangle, equals	Btx
<code>&nsc;</code>	does not succeed	Bnq
<code>&nsce;</code>	not succeeds, equals	Bnu
<code>&nsim;</code>	not similar; not equivalent to	Br1
<code>&nsime;</code>	not similar, equals; not asymptotically equal to	Br2
<code>&nsu;</code>	not subset; non-proper inclusion in set	Bpc
<code>&nsu;</code>	not subset, equals; not contained in or not eql to	Bpf
<code>&nsuE;</code>	not subset, double equals	Bpi
<code>&nsup;</code>	not superset; does not properly include in set	Brc
<code>&nsupe;</code>	not superset, equals; does not contain as subset	Brf
<code>&nsupE;</code>	not superset, double equals	Bri
<code>&nu;</code>	nu – Greek –	CDn
<code>&nvDash;</code>	not vertical, double-dash	Bex
<code>&nVDash;</code>	not double vertical, double dash	Bev
<code>&nVdash;</code>	not double vertical, dash	Beu
<code>&nvdash;</code>	not vertical, dash	Bes
<code>&nwarhk;</code>	N-W arrow, hooked	Bbc
<code>&nwarr;</code>	arrow, north-west	Bci
<code>&nwnear;</code>	N-W, N-E arrows	Bb5
<code>&oast;</code>	circled asterisk	Bs2
<code>&ocir;</code>	open dot in circle	Bsn
<code>&odash;</code>	circled dash; hyphen in circle	Bsl
<code>&odot;</code>	bull's eye (phonetic symbol)	Pbo
<code>&OElig;</code>	small capital O-E ligature (phonetic symbol)	Pfo
<code>&oelig;</code>	o-e ligature (phonetic symbol)	Peo
<code>&ogon;</code>	polish hook, Ogonek (accent)	CAX
<code>&olarr;</code>	left arrow in circle	Bbp
<code>&omega;</code>	lower-case omega (phonetic symbol)	Pho
<code>&Omega;</code>	omega (capital) – Greek –	CEw
<code>&omicr;</code>	omicron – Greek –	CDo
<code>&ominus;</code>	minus sign in circle; symmetric difference	Bsp
<code>&oplus;</code>	plus sign in circle; direct sum; earth sign	Bsr
<code>&Or;</code>	double supremum (conjunction); double logical or	Biq
<code>&or;</code>	logical or; small supremum	Bim
<code>&orarr;</code>	right arrow in circle	Bbq
<code>&origof;</code>	original of	Bpp
<code>&Oslash;</code>	capital O, slashed	CFp
<code>&oslash;</code>	slashed o (phonetic symbol)	Pdo
<code>&osol;</code>	solidus in circle	Bsm
<code>&otimes;</code>	multiplication sign in circle; direct product	Bss
<code>&ovbar;</code>	circle, and vertical bar	Bsq
<code>&par;</code>	double Pipe (phonetic symbol)	Pi1
<code>&para;</code>	paragraph sign; pilcrow	Bfd
<code>&part;</code>	curly d; differential – Greek –	CD6
<code>&pcy;</code>	peh – Cyrillic–	CBp
<code>&Pcy;</code>	Peh – Cyrillic –	CCp
<code>&permil;</code>	per thousand; per mille	Bhm

Entity name	Description	Coordinate
<code>&perp;</code>	perpendicular; orthogonal to	Bdp
<code>&phi;</code>	phi – Greek –	CDf
<code>&Phi;</code>	phi (capital) – Greek –	CEf
<code>&phiv;</code>	phi (cursive,open) – Greek –	CD4
<code>&phone;</code>	telephone-symbol	Bg9
<code>&pi;</code>	pi – Greek –	CDp
<code>&Pi;</code>	pi (capital) – Greek –	CEp
<code>&piv;</code>	physicians' pi – Greek –	CD2
<code>&plankv;</code>	Planck constant; h-bar (Dirac)	Buh
<code>&plusb;</code>	plus sign in box	Bs7
<code>&plusdo;</code>	plus sign, dot above; direct sum	Btb
<code>&plusmn;</code>	plus or minus sign	Btc
<code>&pound;</code>	pound sign	Bhd
<code>&pr;</code>	precedes; has lower rank than; is dominated by	Bkq
<code>&prap;</code>	precedes, approximate	Bks
<code>&prcue;</code>	curly prec. equal; has rank lower than or equal to	Bku
<code>&pre;</code>	precedes, equals	Bkt
<code>&prime;</code>	prime; minutes; feet	Bm5
<code>&Prime;</code>	double prime; seconds; inches	Bm6
<code>&prnap;</code>	precedes, not approximately	Bls
<code>&prnE;</code>	precedes, not double equal	Blt
<code>&prnsim;</code>	precedes, not similar	Blr
<code>&prod;</code>	product operator	Bjb
<code>&prop;</code>	is proportional to; varies as	Bmz
<code>&prsim;</code>	precedes, similar; dominance; contained in, equiv.	Bkr
<code>&psi;</code>	psi – Greek –	CDy
<code>&Psi;</code>	psi (capital) – Greek –	CEy
<code>&puncsp;</code>	Punctuation space; thousand separator	Ba9
<code>&rAarr;</code>	right triple arrow	Bap
<code>&radic;</code>	root; radical sign	Bje
<code>&rang;</code>	right angle bracket	Bea
<code>&raquo;</code>	close double guillemet; angle close quote	CF8
<code>&rarr;</code>	right arrow; approaches	Bam
<code>&rArr;</code>	right double arrow; implies	Ban
<code>&Rarr;</code>	two-head right arrow; on to map	Baw
<code>&rarr2;</code>	two right arrows	Bat
<code>&rarrhk;</code>	right arrow-hooked	Bak
<code>&rarrlp;</code>	right arrow, looped	Bbk
<code>&rarrtl;</code>	right arrow-tailed	Baz
<code>&rarrw;</code>	right arrow-wavy; functional relationship	Baj
<code>&rceil;</code>	right ceiling; bottomless right bracket	Be2
<code>&rdquo;</code>	double quotation mark, right	CF0
<code>&rect;</code>	rectangle open, horizontal	Bgx
<code>&reg;</code>	registered sign (circled R)	Bhs
<code>&rfisht;</code>	right fish tail; element precedes under relation;	Bdy
<code>&rfloor;</code>	right floor; topless right bracket	Be1
<code>&rhard;</code>	right harpoon, down	Bbj

Entity name	Description	Coordinate
<code>&rharu;</code>	right harpoon-up	Bal
<code>&rho;</code>	rho – Greek –	CDr
<code>&rhov;</code>	rho (cursive, round) – Greek –	CD9
<code>&ring;</code>	circle (accent)	CAg
<code>&rlarr2;</code>	right over left arrow; reversible reaction	Bad
<code>&rlhar2;</code>	right over left harpoon; reversible reaction	Bab
<code>&roang;</code>	right open angular bracket	Bed
<code>&robrk;</code>	right open bracket	Bec
<code>&rpargt;</code>	right parenthesis, greater	Bi0
<code>&rsh;</code>	right hook arrow up	Bcw
<code>&rsquo;</code>	apostrophe (phonetic symbol)	Pj2
<code>&rthree;</code>	right three times	Bsg
<code>&rtimes;</code>	times sign, right closed	Bse
<code>&rtri;</code>	right triangle open	Bf3
<code>&rtrie;</code>	right triangle, equal	Btv
<code>&rtrif;</code>	right triangle, filled	Bf7
<code>&sc;</code>	succeeds; has higher rank than; dominates	Bmq
<code>&scap;</code>	succeeds, approximate	Bms
<code>&sccue;</code>	succ., curly eq; has rank higher than or equal to	Bmu
<code>&sce;</code>	succeeds, equals	Bmt
<code>&scnap;</code>	succeeds, not approximate	Bns
<code>&scnE;</code>	succeeds but, not (double) equal to	Bnt
<code>&scnsim;</code>	succeeds, not similar	Bnr
<code>&scsim;</code>	succeeds, similar	Bmr
<code>&searhk;</code>	S-E arrow, hooked	Bbb
<code>&searr;</code>	arrow, south-east; decays	Bcj
<code>&sect;</code>	section sign	Bfc
<code>&seswar;</code>	S-E, S-W arrows	Bb3
<code>&sharp;</code>	sharp (music)	Bhx
<code>&shchcy;</code>	shchah – Cyrillic–	CBw
<code>&SHCHcy;</code>	Shchah – Cyrillic –	CCw
<code>&shcy;</code>	shah – Cyrillic–	CBx
<code>&SHcy;</code>	Shah – Cyrillic –	CCx
<code>&sigma;</code>	sigma – Greek –	CDs
<code>&Sigma;</code>	sigma (capital) – Greek –	CEs
<code>&sigmav;</code>	sigma (final) – Greek –	CDv
<code>&sim;</code>	similar; equivalent to; varies linearly with	Bq1
<code>&sime;</code>	similar, equals; asymptotically equal to	Bq2
<code>&simg;</code>	greater than, approximately	Bmh
<code>&siml;</code>	less than and approximately	Bkh
<code>&smile;</code>	up curve, smile	Bm1
<code>&softcy;</code>	myakhky znak – Cyrillic–	CB4
<code>&SOFTcy;</code>	Myakhky znak – Cyrillic –	CC4
<code>&spades;</code>	spadesuit; spade, filled	Bfj
<code>&sqcap;</code>	square intersection	Bik
<code>&sqcup;</code>	square union	Bij
<code>&sqsub;</code>	square subset; image of	Bok

Entity name	Description	Coordinate
<code>&sqsube;</code>	square subset, equals	Bol
<code>&sqsup;</code>	square superset; original of	Bqk
<code>&sqsupe;</code>	square superset, equals	Bql
<code>&squ;</code>	square; D'Alembertian operator	Bfn
<code>&sqf;</code>	square filled, end of proof; Halmos	Bfo
<code>&star;</code>	star, open	Bfl
<code>&starf;</code>	small (5-point) star, filled	Bl0
<code>&sub;</code>	subset; proper inclusion in set; is implied by	Boc
<code>&Sub;</code>	double subset	Boj
<code>&subE;</code>	subset, double equals	Bog
<code>&sube;</code>	subset, equals; identity or inclusion in set	Bod
<code>&subne;</code>	subset, not equals	Bpd
<code>&subnE;</code>	subset, not double equal	Bpg
<code>&sum;</code>	summation operator	Bja
<code>&Sup;</code>	double superset	Bqj
<code>&sup;</code>	superset; properly includes in set; implies	Bqc
<code>&supe;</code>	superset, equals; ident.with or contains as subset	Bqd
<code>&supE;</code>	superset, double equals	Bqg
<code>&supne;</code>	superset, not equals	Brd
<code>&supnE;</code>	superset, not double equals	Brg
<code>&swarhk;</code>	S-W arrow, hooked	Bba
<code>&swarr;</code>	arrow, south-west	Bcl
<code>&swnwar;</code>	S-W, N-W arrows	Bb4
<code>&szlig;</code>	es-zet (German)	CFs
<code>&tau;</code>	tau – Greek –	CDt
<code>&tcy;</code>	teh – Cyrillic–	CBt
<code>&there4;</code>	therefore	Bru
<code>&Theta;</code>	theta (capital) – Greek –	CEq
<code>&theta;</code>	theta (phonetic symbol)	Pft
<code>&thetav;</code>	theta (cursive, rounded) – Greek –	CDj
<code>&thorn;</code>	thorn (phonetic symbol)	Pbp
<code>&THORN;</code>	THORN (phonetic symbol)	Pcp
<code>&tilde;</code>	tilde (accent)	CAi
<code>&times;</code>	multiplication sign	Bsa
<code>&timesb;</code>	multiplication sign in box	Bs8
<code>&tprime;</code>	triple prime	Bm7
<code>&trade;</code>	trade mark sign (circled TM)	Bht
<code>&trie;</code>	triangle, equal; equal by definition	Bqr
<code>&TScy;</code>	Tseh – Cyrillic –	CCc
<code>&tscy;</code>	tseh – Cyrillic–	CBc
<code>&twixt;</code>	between	Bln
<code>&uarr;</code>	upward arrow; increase; exponent	Bce
<code>&uArr;</code>	up double arrow; implies	Bcf
<code>&uarr2;</code>	two upward arrows	Bct
<code>&Ucy;</code>	Oo – Cyrillic –	CCu
<code>&uharl;</code>	up harpoon left	Bcg
<code>&uharr;</code>	up harpoon right	Bch

Entity name	Description	Coordinate
<code>&ulcorn;</code>	up left corner	Bd4
<code>&uml;</code>	double dot, umlaut, diaeresis (accent)	CAe
<code>&uplus;</code>	plus sign in union	Bi1
<code>&upsi;</code>	upsilon – Greek –	CDu
<code>&Upsi;</code>	upsilon (capital) – Greek –	CEu
<code>&urcorn;</code>	corner (phonetic symbol)	Pg2
<code>&utri;</code>	up triangle open	Bf1
<code>&utrif;</code>	up triangle, filled	Bf5
<code>&varr;</code>	up-down arrow; vertical relationship	Bcr
<code>&vArr;</code>	up and down double arrow; if and only if	Bcs
<code>&Vbar;</code>	double perpendicular	Bdr
<code>&vcy;</code>	veh – Cyrillic–	CBv
<code>&VDash;</code>	double vertical, double dash	Bdv
<code>&vDash;</code>	vert., 2-dsh; models; statement is true; result in	Bdx
<code>&Vdash;</code>	double vertical, dash	Bdu
<code>&vdash;</code>	vertical, dash; assertion; reduced to	Bds
<code>&veebar;</code>	logical or, bar below; injective	Biw
<code>&Vvdash;</code>	triple vertical, dash	Bdw
<code>&wedgeq;</code>	estimates; corresponds to	Bqq
<code>&weierp;</code>	Weierstrass elliptic function	Bjo
<code>&wreath;</code>	wreath product	Bsi
<code>&xcap;</code>	intersection of classes; prod.of cl/sets betw. lmt	Bjg
<code>&xcup;</code>	union of classes/sets; sum or sets between limits	Bjf
<code>&xdtri;</code>	big down triangle open	Bg2
<code>&xi;</code>	xi – Greek –	CDx
<code>&Xi;</code>	xi (capital) – Greek –	CEx
<code>&xsqcup;</code>	big square union	Bjj
<code>&xuplus;</code>	plus sign in big union	Bjl
<code>&xutri;</code>	big up triangle open	Bg1
<code>&xvee;</code>	large supremum	Bjm
<code>&xwedge;</code>	large infimum	Bjn
<code>&yacy;</code>	yah – Cyrillic–	CBj
<code>&YAcy;</code>	Yah – Cyrillic –	CCj
<code>&ycy;</code>	yery – Cyrillic–	CBY
<code>&Ycy;</code>	Yery – Cyrillic –	CCY
<code>&yen;</code>	yen sign	Bhf
<code>&yucy;</code>	u – Cyrillic–	CB5
<code>&YUcy;</code>	U – Cyrillic –	CC5
<code>&z.aacute;</code>	extra high, accent (phonetic symbol)	Pa6
<code>&z.And;</code>	double logical and	Bip
<code>&z.archs;</code>	subscript arch (phonetic symbol)	Pr2
<code>&z.arrdl;</code>	rounded arrow down, left	Bcz
<code>&z.arrdr;</code>	rounded arrow down, right	Bcy
<code>&z.atr;</code>	advanced tongue root (phonetic symbol)	Pf3
<code>&z.ausco;</code>	a-underscore	CFu
<code>&z.bar;</code>	bar (phonetic symbol)	Pb5
<code>&z.Barpip;</code>	double-barred pipe (phonetic symbol)	Pg1

Entity name	Description	Coordinate
&z.betav;	curly beta – Greek –	CD7
&z.bigdot;	big dot above (accent)	CAn
&z.btdl;	belted l (phonetic symbol)	Pcl
&z.btmlig;	bottom ligature (phonetic symbol)	Pt2
&z.btyogh;	yogh, bent tail (phonetic symbol)	Pgz
&z.cansls;	cancellation slash (overlay)	CAz
&z.ccirf;	centered small circle, filled	BI9
&z.Cint;	principal-value integral: cauchy integral	Bju
&z.cirfb;	circle, bottom filled	Bgw
&z.cirfl;	circle, left filled	Bgt
&z.cirfr;	circle, right filled	Bgu
&z.cirft;	circle, top filled	Bgv
&z.clomeg;	closed omega (phonetic symbol)	Pio
&z.crepsv;	closed reversed epsilon (phonetic symbol)	Pie
&z.ctl;	curly tail (phonetic symbol)	Pb8
&z.dbnd;	double bond; length as m-dash	Boq
&z.dbnd6;	6-point double bond; length half of m-dash	Bpq
&z.ddfnc;	dotted fence	Bem
&z.defas;	defined as	Bqw
&z.dfn;	double-rule fence; norm of a matrix	Bdl
&z.dlcor;	left bottom corner, long	Bd5
&z.drcor;	right bottom corner, long	Be5
&z.drule;	-45 degree rule	Bow
&z.dshfnc;	dashed fence	Beo
&z.duarr;	dbl arrow, left down, right up	Bcn
&z.duhar2;	harpoon down, up	Bcl
&z.dyogh;	d-Yogh ligature (phonetic symbol)	Pdd
&z.Ehac;	equiangular; equals with hacek	Brq
&z.eint;	edge-integral	Bjz
&z.eng;	eng (phonetic symbol)	Pdn
&z.esh;	esh (phonetic symbol)	Pds
&z.fals;	falling, symbol (phonetic symbol)	Pj7
&z.fhr;	fish-hook r (phonetic symbol)	Pbr
&z.ggrave;	extra low, accent (phonetic symbol)	Pb6
&z.glst;	glottal stop (phonetic symbol)	Pa1
&z.Gt;	much greater than (double)	Bmm
&z.gull;	seagull (phonetic symbol)	Pe3
&z.hbar;	horizontal bar (phonetic symbol)	Pd3
&z.heng;	heng (phonetic symbol)	Pih
&z.herma;	hermaphrodite	Bh8
&z.hex;	hexagon	Bo2
&z.hfl;	guilders sign	Bhe
&z.highs;	high, symbol (phonetic symbol)	Pf7
&z.hlmrk;	half-length mark (phonetic symbol)	Ph2
&z.hris;	high rising, accent (phonetic symbol)	Pc6
&z.hriss;	high rising, symbol (phonetic symbol)	Pc7
&z.hrttrh;	turned h, hook right tail (phonetic symbol)	Pgh

Entity name	Description	Coordinate
&z.ht;	hooktop (phonetic symbol)	Pa8
&z.hvlig;	h-v ligature (phonetic symbol)	Phh
&z.Inf;	double infinum (cumulator)	Bit
&z.inglst;	inverted glottal stop (phonetic symbol)	Pb1
&z.invv;	inverted v (phonetic symbol)	Pga
&z.invw;	inverted w (phonetic symbol)	Pbw
&z.jup;	Jupiter	Bh5
&z.lam;	laminal (phonetic symbol)	Pa3
&z.Lap;	up triangle open with dot; Laplace operator	Bj5
&z.lbd2bd;	2 bonds on the lefthand side, bottom double	Bn4
&z.lbd2td;	2 bonds on the lefthand side, top double	Bn3
&z.lbond2;	2 bonds on the lefthand side	Bpw
&z.lbond3;	3 bonds on the lefthand side	Bpu
&z.ldang;	left double angle bracket	Bdb
&z.lmrk;	length mark (phonetic symbol)	Pi2
&z.low;	lowering sign (phonetic symbol)	Pc2
&z.lows;	low, symbol (phonetic symbol)	Ph7
&z.lozfl;	lozenge, left filled	Bgg
&z.lozfr;	lozenge, right filled	Bgh
&z.lpargt;	left parenthesis, gt	Bi9
&z.lris;	low rising, accent (phonetic symbol)	Pd6
&z.lriss;	low rising, symbol (phonetic symbol)	Pd7
&z.lsquo;	open single guillemet	CE7
&z.Lt;	much less than (double)	Bkm
&z.ltlmr;	m with leftward tail at right (phonetic symbol)	Pbm
&z.ltlr;	n with left tail at left (phonetic symbol)	Pcn
&z.ltril;	left elongated triangle; implied by	Bi1
&z.lyogh;	l-Yogh ligature (phonetic symbol)	Pe1
&z.mdc;	mid centralized (phonetic symbol)	Pq3
&z.merc;	Mercury	Bh3
&z.mho;	mho	CE2
&z.mids;	mid, symbol (phonetic symbol)	Pg7
&z.minhat;	minus with hat	Bts
&z.mstpos;	most positive	Bkz
&z.nasymp;	not asymptotically equivalent	Brw
&z.nbump;	not isomorphic	Brn
&z.nept;	Neptune	Bh9
&z.nesim;	not equal, similar	Bmp
&z.nglpar;	angle and left parentheses	Bk4
&z.ngtneq;	neither greater than nor equivalent to	Bnh
&z.ngtnlt;	neither greater than nor less than	Bni
&z.nlr;	n, long right leg (phonetic symbol)	Pgn
&z.nltneq;	neither less than nor equivalent to	Blh
&z.nltngt;	neither less than nor greater than	Bli
&z.nrarrc;	slashed curly arrow	Bb1
&z.nsubE;	not subset, double equals	Bph
&z.nsubne;	not subset, not equals	Bpe

Entity name	Description	Coordinate
&z.nsupE;	not superset, double equals	Brh
&z.nsupne;	not superset, not equals	Bre
&z.odiv;	circle divide	Bsk
&z.openo;	open o (phonetic symbol)	Pgo
&z.oplusl;	semi-direct sum	Bst
&z.oplusr;	semi-direct sum	Bsv
&z.Or;	double logical or	Bio
&z.otimsl;	semi-direct product	Bsu
&z.otimsr;	semi-direct product	Bsw
&z.ousco;	o-underscore	CFv
&z.pa;	lower-case a (phonetic symbol)	Paa
&z.palh;	palatization hook (phonetic symbol)	Po2
&z.parl;	parallelogram	Bgz
&z.pbgam;	baby gamma (phonetic symbol)	Peg
&z.pdbdbd;	partial double bond, bottom dashed	Bo4
&z.pdbdtd;	partial double bond, top dashed	Bo3
&z.pdbond;	Partial double bond	Bo8
&z.pent;	pentagon	Bo1
&z.pes;	Pesetas sign	Bhg
&z.pg;	lower-case 'script' g (phonetic symbol)	Pag
&z.pgamma;	gamma (phonetic symbol)	Pdg
&z.plims;	circle and long bar; Plimsoll sign	Bs3
&z.ppcnt;	per 10 000	Bhn
&z.pphi;	phi (phonetic symbol)	Pep
&z.pscra;	script a (phonetic symbol)	Pca
&z.pscrvi;	script v (phonetic symbol)	Pbv
&z.pSlash;	double Slash (phonetic symbol)	Pj1
&z.ptbdbd;	partial triple bond, bottom dashed	Bo6
&z.ptbdtd;	partial triple bond, top dashed	Bo5
&z.pupsil;	upsilon (phonetic symbol)	Pcu
&z.qbnd;	quadruple bond; length as m-dash	Bos
&z.qbnd6;	six-point quadruple bond; length half of m-dash	Bps
&z.qprime;	fourfold prime	Bm8
&z.rad;	radical dot	Bo0
&z.rais;	raising sign (phonetic symbol)	Pb2
&z.rarrc;	curly arrow	Ba1
&z.rarrx;	right arrow, crossed	Bbl
&z.rbd2bd;	2 bonds on the righthand side, bottom double	Bn6
&z.rbd2td;	2 bonds on the righthand side, top double	Bn5
&z.rbond2;	2 bonds on the righthand side	Bpv
&z.rbond3;	3 bonds on the righthand side	Bpt
&z.rdang;	right double angle bracket	Beb
&z.reapos;	reversed apostrophe (phonetic symbol)	Pk2
&z.refhr;	fish-hook r, reversed (phonetic symbol)	Pjr
&z.refhrl;	reversed fish-hook r, long leg (phonetic symbol)	Plr
&z.reglst;	reversed glottal stop (phonetic symbol)	Pc1
&z.repsiv;	reversed epsilon (phonetic symbol)	Pge

Entity name	Description	Coordinate
&z.reshtl;	esh reversed, top loop (phonetic symbol)	Pfs
&z.resmck;	small capital K, reversed (phonetic symbol)	Pdk
&z.reve;	reversed e (phonetic symbol)	Pde
&z.rh;	right hook (phonetic symbol)	Pp2
&z.rhkd;	right hook, down	Bcx
&z.risfla;	rising-falling, accent (phonetic symbol)	Pe6
&z.risfls;	rising-falling, symbol (phonetic symbol)	Pe7
&z.riss;	rising, symbol (phonetic symbol)	Pi7
&z.rl;	r with long leg (phonetic symbol)	Pcr
&z.rLarr;	short arrow right, long arrow left	Ba3
&z.Rlarr;	long arrow right, short arrow left	Ba2
&z.rndcap;	round cap (phonetic symbol)	Pq2
&z.rparlt;	right parenthesis, less than	Bi8
&z.rsquo;	close single guillemet	CF7
&z.rtld;	right-tail d (phonetic symbol)	Pcd
&z.rtll;	l with right tail (phonetic symbol)	Pdl
&z.rtl;n;	n with right tail (phonetic symbol)	Pen
&z.rtlr;	r with right tail (phonetic symbol)	Pdr
&z.rtls;	s with right tail (phonetic symbol)	Pcs
&z.rtl;t;	t with right tail (phonetic symbol)	Pct
&z.rtlz;	z with right tail (phonetic symbol)	Pdz
&z.rtr;	retracted tongue root (phonetic symbol)	Pg3
&z.rtrfhr;	reversed fish-hook r, right tail (phonetic symbol)	Pkr
&z.rtrrn;	turned r with right tail (phonetic symbol)	Pfr
&z.rvbullet;	reversed video bullet	Bg7
&z.S;	S-sign	Bji
&z.sat;	Saturn	Bh6
&z.sbrg;	subscript bridge (phonetic symbol)	Pa2
&z.sbrgt;	subscript bridge, turned (phonetic symbol)	Pa5
&z.sblhr;	left half-ring (phonetic symbol)	Pm2
&z.sbnd;	single bond	Bo7
&z.sbrhr;	right half-ring (phonetic symbol)	Pn2
&z.sbs;	small backslash (phonetic symbol)	P11
&z.sbw;	subscript w (phonetic symbol)	Pc3
&z.schwa;	schwa (phonetic symbol)	Pbe
&z.scis;	scissor-symbol	Bg8
&z.sfnc;	single-rule fence	Bdk
&z.shtsls;	short slash (overlay)	CAy
&z.simne;	approximately but not actually equal to	Brz
&z.sint;	surface integral	Bjw
&z.sqfb;	square, bottom filled	Bfw
&z.sqfl;	square, left filled	Bft
&z.sqfne;	square with filled N-E-corner	Bfp
&z.sqfnw;	square with filled N-W-corner	Bfq
&z.sqfr;	square, right filled	Bfu
&z.sqfse;	square with filled S-E-corner	Bfs
&z.sqfsw;	square with filled S-W-corner	Bfr

Entity name	Description	Coordinate
<code>&z.sqft;</code>	square, top filled	Bfv
<code>&z.sqh;</code>	legend symbol; horizontally striped box	Bgp
<code>&z.sqint;</code>	lattice-integral	Bj4
<code>&z.sqne;</code>	legend symbol; north-east striped box	Bgs
<code>&z.sqnrsb;</code>	square not reflex subset	Bpl
<code>&z.sqnrsp;</code>	square not reflex superset	Brl
<code>&z.sqnsb;</code>	square not subset	Bpk
<code>&z.sqnsup;</code>	square not superset	Brk
<code>&z.sqsbne;</code>	Square subset, not equal	Bpm
<code>&z.sqshd;</code>	legend symbol; shaded box	Bg6
<code>&z.sqspne;</code>	square superset, not equal	Brm
<code>&z.sqsw;</code>	legend symbol; south-west striped box	Bgr
<code>&z.sqv;</code>	legend symbol; vertically striped box	Bgq
<code>&z.Sup;</code>	double supremum (cumulator)	Bis
<code>&z.syllab;</code>	syllabicity mark (phonetic symbol)	Pf2
<code>&z.tbnd;</code>	triple bond; length as m-dash	Bor
<code>&z.tbnd6;</code>	6-point triple bond; length half of m-dash	Bpr
<code>&z.tdcol;</code>	triple dot colon	Bek
<code>&z.tdfnc;</code>	triple dot fence	Bel
<code>&z.tDot;</code>	triple dot (accent)	CAp
<code>&z.tesh;</code>	t-esh ligature (phonetic symbol)	Pdt
<code>&z.tfnc;</code>	triple vertical-rule fence	Bdm
<code>&z.Theta;</code>	Theta (capital, round)	CEj
<code>&z.Thr;</code>	big square intersection	Bjk
<code>&z.Times;</code>	vector multiplication	Bsb
<code>&z.toplig;</code>	top ligature (phonetic symbol)	Ps2
<code>&z.trgull;</code>	seagull, turned (phonetic symbol)	Pb3
<code>&z.trisla;</code>	triple Slash (phonetic symbol)	Pk1
<code>&z.Trkhk;</code>	Turkish hook (accent)	CAh
<code>&z.trna;</code>	turned a (phonetic symbol)	Pba
<code>&z.trnh;</code>	turned h (phonetic symbol)	Peh
<code>&z.trnk;</code>	turned k (phonetic symbol)	Pck
<code>&z.trnm;</code>	turned m (phonetic symbol)	Pcm
<code>&z.trnmlr;</code>	turned m with long right leg (phonetic symbol)	Pdm
<code>&z.trnomeg;</code>	inverted omega (phonetic symbol)	Pko
<code>&z.trnr;</code>	turned r (phonetic symbol)	Per
<code>&z.trnrl;</code>	turned longlegged r (phonetic symbol)	Pgr
<code>&z.trnsa;</code>	turned script a (phonetic symbol)	Pda
<code>&z.trnt;</code>	turned t (phonetic symbol)	Pet
<code>&z.trny;</code>	turned y (phonetic symbol)	Pby
<code>&z.udarr;</code>	dbl arrow, left up, right down; anti-parallel to	Bcm
<code>&z.udhar2;</code>	harpoon up, down	Bc2
<code>&z.urule;</code>	+45 degree rule	Box
<code>&z.utdot;</code>	triple dot, diagonal SW-NE	Bo9
<code>&z.veeBar;</code>	logical or, dbl bar below	Biy
<code>&z.verti;</code>	vertical stroke (inferior) (phonetic symbol)	Pe2
<code>&z.verts;</code>	vertical stroke (superior) (phonetic symbol)	Pd2

Entity name	Description	Coordinate
<code>&z.vint;</code>	volume integral	Bjx
<code>&z.vrecto;</code>	rectangle open, vertical	Bgy
<code>&z.xhair;</code>	crosshairs; circle and (big) plus sign	Bs4
<code>&z.xhighs;</code>	extra high, symbol (phonetic symbol)	Pa7
<code>&z.xl;</code>	cross, short horizontal line (phonetic symbol)	Pc5
<code>&z.xlows;</code>	extra low, symbol (phonetic symbol)	Pb7
<code>&z.xrat;</code>	cross ratio	Bjh
<code>&z.yogh;</code>	yogh (phonetic symbol)	Pez
<code>&Zcy;</code>	Zeh – Cyrillic –	CCz
<code>&zcy;</code>	zeh – Cyrillic–	CBz
<code>&zeta;</code>	zeta – Greek –	CDz
<code>&zncy;</code>	zheh – Cyrillic–	CB7
<code>&ZHcy;</code>	Zheh – Cyrillic –	CC7

Coordinate	Content	Description
Ba0	 	no break (required) space
Ba1	&z.rarrc;	curly arrow
Ba2	&z.Rlarr;	long arrow right, short arrow left
Ba3	&z.rLarr;	short arrow right, long arrow left
Ba9	 	Punctuation space; thousand separator
Baa	&lhar2;	left over right harpoon; reversible reaction
Bab	&rlhar2;	right over left harpoon; reversible reaction
Bac	&lrarr2;	left over right arrow; reversible reaction
Bad	&rlarr2;	right over left arrow; reversible reaction
Bae	↩	left arrow-hooked
Baf	↼	left harpoon-up
Bag	←	left arrow; relata of a relation
Bah	⇐	left double arrow; is implied by
Bai	↭	left and right arrow-wavy
Baj	↝	right arrow-wavy; functional relationship
Bak	↪	right arrow-hooked
Bal	⇀	right harpoon-up
Bam	→	right arrow; approaches
Ban	⇒	right double arrow; implies
Bao	↦	mapping; maps to
Bap	⇛	right triple arrow
Baq	⇚	left triple arrow
Bar	↔	left-right arrow; mutually implies
Bas	⇔	left-right dbl arrow; if and only if; mut. implies
Bat	&rarr2;	two right arrows
Bau	&larr2;	two left arrows
Bav	↞	two-head left arrow
Baw	↠	two-head right arrow; on to map
Bax	⤅	two-head right arrow, ended
Bay	↢	left arrow-tailed
Baz	↣	right arrow-tailed
Bb1	&z.nrarrc;	slashed curly arrow
Bb2	⤨	N-E, S-E arrows
Bb3	⤩	S-E, S-W arrows
Bb4	⤪	S-W, N-W arrows
Bb5	⤧	N-W, N-E arrows
Bba	⤦	S-W arrow, hooked
Bbb	⤥	S-E arrow, hooked
Bbc	⤣	N-W arrow, hooked
Bbd	⤤	N-E arrow, hooked
Bbe	↫	left arrow, looped
Bbf	↽	left harpoon, down
Bbg	↚	not left arrow
Bbh	⇍	not left double arrow; not implied by
Bbj	⇁	right harpoon, down
Bbk	↬	right arrow, looped

Coordinate	Content	Description
Bbl	<code>&z.rarrx;</code>	right arrow, crossed
Bbm	<code>&nrarr;</code>	not right arrow; does not tend to
Bbn	<code>&nrArr;</code>	not right double arrow; does not imply
Bbp	<code>&olarr;</code>	left arrow in circle
Bbq	<code>&orarr;</code>	right arrow in circle
Bbr	<code>&nharr;</code>	not left-right arrow
Bbs	<code>&nhArr;</code>	not left-right dbl arrow; negation of mut. implies
Bbw	<code>&lsh;</code>	left hook arrow up
Bc1	<code>&z.duhar2;</code>	harpoon down, up
Bc2	<code>&z.udhar2;</code>	harpoon up, down
Bca	<code>&dharl;</code>	down harpoon left
Bcb	<code>&dharr;</code>	down harpoon right
Bcc	<code>&darr;</code>	downward arrow; decreases
Bcd	<code>&dArr;</code>	down double arrow; implies
Bce	<code>&uarr;</code>	upward arrow; increase; exponent
Bcf	<code>&uArr;</code>	up double arrow; implies
Bcg	<code>&uharl;</code>	up harpoon left
Bch	<code>&uharr;</code>	up harpoon right
Bci	<code>&nwarr;</code>	arrow, north-west
Bcj	<code>&searr;</code>	arrow, south-east; decays
Bck	<code>&nearr;</code>	arrow, north-east; grows
Bcl	<code>&swarr;</code>	arrow, south-west
Bcm	<code>&z.udarr;</code>	dbl arrow, left up, right down; anti-parallel to
Bcn	<code>&z.duarr;</code>	dbl arrow, left down, right up
Bcp	<code>&cularr;</code>	left curved arrow; anti-clockwise arrow
Bcq	<code>&curarr;</code>	right curved arrow; clockwise arrow
Bcr	<code>&varr;</code>	up-down arrow; vertical relationship
Bcs	<code>&vArr;</code>	up and down double arrow; if and only if
Bct	<code>&uarr2;</code>	two upward arrows
Bcu	<code>&darr2;</code>	two downward arrows
Bcw	<code>&rsh;</code>	right hook arrow up
Bcx	<code>&z.rhkd;</code>	right hook, down
Bcy	<code>&z.arrdr;</code>	rounded arrow down, right
Bcz	<code>&z.arrdl;</code>	rounded arrow down, left
Bd1	<code>&lflor;</code>	left floor; topless left bracket
Bd2	<code>&lceil;</code>	left ceiling; bottomless left bracket
Bd3	<code>&dlcorn;</code>	down left corner
Bd4	<code>&ulcorn;</code>	up left corner
Bd5	<code>&z.dlcorn;</code>	left bottom corner, long
Bd6	<code>&mid;</code>	shortmid (Height of small x)
Bd7	<code>&par;</code>	short parallel (Height small x)
Bda	<code>&lang;</code>	left angle bracket
Bdb	<code>&z.ldang;</code>	left double angle bracket
Bdc	<code>&llobrk;</code>	left open bracket
Bdd	<code>&loang;</code>	left open angular bracket
Bdi	<code>&mid;</code>	divides; mid (Height of capital I)

Coordinate	Content	Description
Bdj	<code>&par;</code>	parallel to (height of capital I)
Bdk	<code>&z.sfn;</code>	single-rule fence
Bdl	<code>&z.dfn;</code>	double-rule fence; norm of a matrix
Bdm	<code>&z.tfn;</code>	triple vertical-rule fence
Bdp	<code>&perp;</code>	perpendicular; orthogonal to
Bdq	<code>&intcal;</code>	intercal; true
Bdr	<code>&Vbar;</code>	double perpendicular
Bds	<code>&vdash;</code>	vertical, dash; assertion; reduced to
Bdt	<code>&dashv;</code>	dash, vertical; turnstile
Bdu	<code>&Vdash;</code>	double vertical, dash
Bdv	<code>&VDash;</code>	double vertical, double dash
Bdw	<code>&Vvdash;</code>	triple vertical, dash
Bdx	<code>&vDash;</code>	vert., 2-dsh; models; statement is true; result in
Bdy	<code>&rfisht;</code>	right fish tail; element precedes under relation;
Be1	<code>&rfloor;</code>	right floor; topless right bracket
Be2	<code>&rceil;</code>	right ceiling; bottomless right bracket
Be3	<code>&drcorn;</code>	down right corner
Be4	<code>&urcorn;</code>	up right corner
Be5	<code>&z.drcorn;</code>	right bottom corner, long
Be6	<code>&nmid;</code>	nshortmid
Be7	<code>&npar;</code>	not short parallel
Bea	<code>&rang;</code>	right angle bracket
Beb	<code>&z.rdang;</code>	right double angle bracket
Bec	<code>&robrk;</code>	right open bracket
Bed	<code>&roang;</code>	right open angular bracket
Bei	<code>&nmid;</code>	not mid
Bej	<code>&npar;</code>	not parallel
Bek	<code>&z.tdcol;</code>	triple dot colon
Bel	<code>&z.tdfn;</code>	triple dot fence
Bem	<code>&z.ddfn;</code>	dotted fence
Ben	<code>&brvbar;</code>	broken vertical bar
Beo	<code>&z.dshfn;</code>	dashed fence
Bes	<code>&nvdash;</code>	not vertical, dash
Beu	<code>&nVdash;</code>	not double vertical, dash
Bev	<code>&nVDash;</code>	not double vertical, double dash
Bex	<code>&nvDash;</code>	not vertical, double-dash
Bey	<code>&lfisht;</code>	left fish tail
Bf1	<code>&utri;</code>	up triangle open
Bf2	<code>&dtri;</code>	down triangle open
Bf3	<code>&rtri;</code>	right triangle open
Bf4	<code>&ltri;</code>	left triangle open
Bf5	<code>&utrif;</code>	up triangle, filled
Bf6	<code>&dtrif;</code>	down triangle, filled
Bf7	<code>&rtrif;</code>	right triangle, filled
Bf8	<code>&ltrif;</code>	left triangle, filled
Bfa	<code>&dagger;</code>	dagger

Coordinate	Content	Description
Bfc	§	section sign
Bfd	¶	paragraph sign; pilcrow
Bfe	✠	Maltese cross
Bff	✓	check mark; tick
Bfg	⋄	diamond
Bfh	♦	diamondsuit; diamond, filled
Bfi	♥	heartsuit; heart, filled
Bfj	♠	spadesuit; spade, filled
Bfk	♣	clubsuit; club, filled
Bfl	☆	star, open
Bfm	★	big (5-point) star, filled
Bfn	&sq;	square; D'Alembertian operator
Bfo	&sqf;	square filled, end of proof; Halmos
Bfp	&z.sqfne;	square with filled N-E-corner
Bfq	&z.sqfnw;	square with filled N-W-corner
Bfr	&z.sqfsw;	square with filled S-W-corner
Bfs	&z.sqfse;	square with filled S-E-corner
Bft	&z.sqfl;	square, left filled
Bfu	&z.sqfr;	square, right filled
Bfv	&z.sqft;	square, top filled
Bfw	&z.sqfb;	square, bottom filled
Bg1	△	big up triangle open
Bg2	&xdttri;	big down triangle open
Bg6	&z.sqshd;	legend symbol; shaded box
Bg7	&z.rvbull;	reversed video bullet
Bg8	&z.scis;	scissor-symbol
Bg9	☎	telephone-symbol
Bga	‡	double dagger; diesis
Bgf	◊	lozenge open; total mark
Bgg	&z.lozfl;	lozenge, left filled
Bgh	&z.lozfr;	lozenge, right filled
Bgi	⧫	lozenge, filled
Bgn	○	circle, open
Bgo	•	filled circle; bullet
Bgp	&z.sqh;	legend symbol; horizontally striped box
Bgq	&z.sqv;	legend symbol; vertically striped box
Bgr	&z.sqsw;	legend symbol; south-west striped box
Bgs	&z.sqne;	legend symbol; north-east striped box
Bgt	&z.cirfl;	circle, left filled
Bgu	&z.cirfr;	circle, right filled
Bgv	&z.cirft;	circle, top filled
Bgw	&z.cirfb;	circle, bottom filled
Bgx	▭	rectangle open, horizontal
Bgy	&z.vrecto;	rectangle open, vertical
Bgz	&z.parl;	parallelogram
Bh3	&z.merc;	Mercury

Coordinate	Content	Description
Bh4	♀	Venus; female
Bh5	&z.jup;	Jupiter
Bh6	&z.sat;	Saturn
Bh7	♂	Mars; male
Bh8	&z.herma;	hermaphrodite
Bh9	&z.nept;	Neptune
Bha	&	ampersand
Bhb	¢	cent sign
Bhc	\$	dollar sign
Bhd	£	pound sign
Bhe	&z.hfl;	guilders sign
Bhf	¥	yen sign
Bhg	&z.pes;	Pesetas sign
Bhj	ð	eth
Bhm	‰	per thousand; per mille
Bhn	&z.ppcent;	per 10 000
Bhr	©	copyright sign (circled C)
Bhs	®	registered sign (circled R)
Bht	™	trade mark sign (circled TM)
Bhw	♭	flat (music)
Bhx	♯	sharp (music)
Bhy	♮	natural (music)
Bi0	⦔	right parenthesis, greater
Bi1	&z.ltril;	left elongated triangle; implied by
Bi2	⋫	not right triangle
Bi4	⋪	not left triangle
Bi7	⦓	left parenthesis, less than
Bi8	&z.rparlt;	right parenthesis, less than
Bi9	&z.lpargt;	left parenthesis, gt
Bia	∀	inverted capital A; for all
Bib	∃	reversed cap. E; there exists; at least one exists
Bic	∄	not rev. cap. E; not exists; there does not exist
Bid	∁	complement
Bif	∪	sum or union of classes or sets; logical sum
Big	∩	prod. of intrsctn of cl./sets; vee; small intrsctn
Bih	⋓	double union; (Cup)
Bii	⋒	double intersection; (Cap)
Bij	⊔	square union
Bik	⊓	square intersection
Bil	⊎	plus sign in union
Bim	∨	logical or; small supremum
Bin	∧	logical and; small infimum; wedge
Bio	&z.Or;	double logical or
Bip	&z.And;	double logical and
Biq	⩔	double supremum (conjunction); double logical or
Bir	⩓	double infimum (conjunction); double logical and

Coordinate	Content	Description
Bis	&z.Sup;	double supremum (cumulator)
Bit	&z.Inf;	double infimum (cumulator)
Biu	⋏	curly logical and
Biv	⋎	curly logical or
Biw	⊻	logical or, bar below; injective
Bix	⌅	logical and, bar above; projective
Biy	&z.veeBar;	logical or, dbl bar below
Biz	⌆	double bar wedge; log and, dbl bar
Bj1	&acoint;	contour integral, anti-clockwise
Bj2	&ccoint;	contour integral, clockwise
Bj3	∱	clockwise integral
Bj4	&z.sqint;	lattice-integral
Bj5	&z.Lap;	up triangle open with dot; Laplace operator
Bja	∑	summation operator
Bjb	∏	product operator
Bjc	∐	inverted product (cumulator)
Bjd	⨿	inverted prod. (conjunction); amalgamation, coprod
Bje	√	root; radical sign
Bjf	⋃	union of classes/sets; sum or sets between limits
Bjg	⋂	intersection of classes; prod.of cl/sets betw. lmt
Bjh	&z.xrat;	cross ratio
Bji	&z.S;	S-sign
Bjj	&xscup;	big square union
Bjk	&z.Thr;	big square intersection
Bjl	⨄	plus sign in big union
Bjm	⋁	large supremum
Bjn	⋀	large infimum
Bjo	℘	Weierstrass elliptic function
Bjp	∫	integral operator
Bju	&z.Cint;	principal-value integral: cauchy integral
Bjv	∮	contour integral; circuital integral
Bjw	&z.sint;	surface integral
Bjx	&z.vint;	volume integral
Bjz	&z.eint;	edge-integral
Bk1	∠	angle
Bk2	∡	angle-measured
Bk3	∢	spherical angle
Bk4	&z.nglpar;	angle and left parentheses
Bk5	&ang90;	right (90 degree) angle; factorial sign
Bk6	&iproduct;	intprod
Bk7	°	degree sign
Bk8	*	mid asterisk
Bk9	∘	centered circle; composite function; convolution
Bka	<	less than sign
Bkb	⩽	less than or equal to, slanted
Bkc	⪕	equal-or-less, slanted

Coordinate	Content	Description
Bkd	<code>&le;</code>	less than or equal
Bke	<code>&lE;</code>	less than or (double) equal
Bkf	<code>&lsim;</code>	less than or similar to; less, approximate
Bkg	<code>&lap;</code>	less than and double approximate
Bkh	<code>&siml;</code>	less than and approximately
Bki	<code>&lg;</code>	less than or greater than
Bkj	<code>&leg;</code>	less, equal, or greater
Bkk	<code>&lEg;</code>	less, (double) equal, or greater
Bkl	<code>&Lt;</code>	much less than (double)
Bkm	<code>&z.Lt;</code>	much less than (double)
Bkn	<code>&Ll;</code>	much less than (triple)
Bko	<code>&ldot;</code>	less than, with dot
Bkp	<code>&esim;</code>	equal, similar
Bkq	<code>&pr;</code>	precedes; has lower rank than; is dominated by
Bkr	<code>&prsim;</code>	precedes, similar; dominance; contained in, equiv.
Bks	<code>&prap;</code>	precedes, approximate
Bkt	<code>&pre;</code>	precedes, equals
Bku	<code>&prcue;</code>	curly prec. equal; has rank lower than or equal to
Bkv	<code>&cuepr;</code>	curly equals (above), precedes
Bkz	<code>&z.mstpos;</code>	most positive
B10	<code>&starf;</code>	small (5-point) star, filled
B15	<code>&bprime;</code>	backprime; reverse prime
B18	<code>*</code>	pseudo-superscript asterisk (ASCII *)
B19	<code>&z.ccirf;</code>	centered small circle, filled
Bla	<code>&nlt;</code>	not less than
Blb	<code>&nles;</code>	neither less than nor equal to, slanted
Bld	<code>&lne;</code>	less than but not equals
Ble	<code>&lnE;</code>	less than but not (double) equal to
Blf	<code>&lnsim;</code>	less than, not similar
Blg	<code>&lnap;</code>	less than but not approximate
Blh	<code>&z.nltneq;</code>	neither less than nor equivalent to
Bli	<code>&z.nltngt;</code>	neither less than nor greater than
Blj	<code>&nle;</code>	not less-than-or-equal
Blk	<code>&nlE;</code>	not less, double equals
Bln	<code>&twixt;</code>	between
Blq	<code>&npr;</code>	does not precede
Blr	<code>&prnsim;</code>	precedes, not similar
Bls	<code>&prnap;</code>	precedes, not approximately
Blt	<code>&prnE;</code>	precedes, not double equal
Blu	<code>&npre;</code>	not precedes, equals
Blz	<code>&infin;</code>	infinity sign
Bm1	<code>&smile;</code>	up curve, smile
Bm2	<code>&frown;</code>	down curve, frown
Bm3	<code>&fork;</code>	pitchfork
Bm5	<code>&prime;</code>	prime; minutes; feet
Bm6	<code>&Prime;</code>	double prime; seconds; inches

Coordinate	Content	Description
Bm7	‴	triple prime
Bm8	&z.qprime;	fourfold prime
Bm9	…	triple dot
Bma	;	greater than sign
Bmb	⩾	greater than or equal to, slanted
Bmc	⪖	equal-or-greater, slanted
Bmd	≥	greater than or equal to
Bme	≧	greater than or double equal to
Bmf	≳	greater than or similar to; greater than approx.
Bmg	⪆	greater than, approximately
Bmh	⪞	greater than, approximately
Bmi	≷	greater than or less than
Bmj	⋛	greater, equal, or less
Bmk	⪌	greater, (double) equal, or less
Bml	≫	much greater than (double)
Bmm	&z.Gt;	much greater than (double)
Bmn	⋙	much greater than (triple)
Bmo	ġ	greater than, with dot
Bmp	&z.nesim;	not equal, similar
Bmq	≻	succeeds; has higher rank than; dominates
Bmr	≿	succeeds, similar
Bms	⪸	succeeds, approximate
Bmt	⪰	succeeds, equals
Bmu	≽	succ., curly eq; has rank higher than or equal to
Bmv	⋟	curly equals (above), succeeds
Bmz	∝	is proportional to; varies as
Bn3	&z.lbd2td;	2 bonds on the lefthand side, top double
Bn4	&z.lbd2bd;	2 bonds on the lefthand side, bottom double
Bn5	&z.rbd2td;	2 bonds on the righthand side, top double
Bn6	&z.rbd2bd;	2 bonds on the righthand side, bottom double
Bn9	⋯	triple dot, centered
Bna	≯	not greater than
Bnb	⩾̸	neither greater than nor equal to, slanted
Bnd	⪈	greater than, not equals to
Bne	≩	greater than but not (double) equal to
Bnf	⋧	greater than but not similar to
Bng	⪊	greater than but not approximate
Bnh	&z.ngtneq;	neither greater than nor equivalent to
Bni	&z.ngtnlt;	neither greater than nor less than
Bnj	≱	not greater-than-or-equal
Bnk	≧̸	not greater, double equals
Bnq	⊁	does not succeed
Bnr	⋩	succeeds, not similar
Bns	⪺	succeeds, not approximate
Bnt	⪶	succeeds but, not (double) equal to
Bnu	⪰̸	not succeeds, equals

Coordinate	Content	Description
Bo0	&z.rad;	radical dot
Bo1	&z.pent;	pentagon
Bo2	&z.hex;	hexagon
Bo3	&z.pdbdtd;	partial double bond, top dashed
Bo4	&z.pdbdbd;	partial double bond, bottom dashed
Bo5	&z.ptbdttd;	partial triple bond, top dashed
Bo6	&z.ptbdbd;	partial triple bond, bottom dashed
Bo7	&z.sbond;	single bond
Bo8	&z.pdbond;	Partial double bond
Bo9	&z.utdot;	triple dot, diagonal SW-NE
Boa	∈	set membership; member
Boc	⊂	subset; proper inclusion in set; is implied by
Bod	⊆	subset, equals; identity or inclusion in set
Bog	⫅	subset, double equals
Boj	⋐	double subset
Bok	&sqs;	square subset; image of
Bol	&sqs;	square subset, equals
Boo	⊸	multimap
Bop	⊷	image of
Boq	&z.dbnd;	double bond; length as m-dash
Bor	&z.tbnd;	triple bond; length as m-dash
Bos	&z.qbnd;	quadruple bond; length as m-dash
Bow	&z.drule;	-45 degree rule
Box	&z.urule;	+45 degree rule
Bp9	⃛	triple dot, diagonal NW-SE
Bpa	∉	not an element of; is not a member of
Bpc	&ns;	not subset; non-proper inclusion in set
Bpd	⊊	subset, not equals
Bpe	&z.nsubne;	not subset, not equals
Bpf	&ns;	not subset, equals; not contained in or not eql to
Bpg	⫋	subset, not double equal
Bph	&z.nsubE;	not subset, double equals
Bpi	&nsE;	not subset, double equals
Bpk	&z.sqns;	square not subset
Bpl	&z.sqnrs;	square not reflex subset
Bpm	&z.sqsbne;	Square subset, not equal
Bpp	⊶	original of
Bpq	&z.dbnd6;	6-point double bond; length half of m-dash
Bpr	&z.tbnd6;	6-point triple bond; length half of m-dash
Bps	&z.qbnd6;	six-point quadruple bond; length half of m-dash
Bpt	&z.rbond3;	3 bonds on the righthand side
Bpu	&z.lbond3;	3 bonds on the lefthand side
Bpv	&z.rbond2;	2 bonds on the righthand side
Bpw	&z.lbond2;	2 bonds on the lefthand side
Bpz	∼	most positive
Bq0	&homthr;	homothetic

Coordinate	Content	Description
Bq1	$\∼$	similar; equivalent to; varies linearly with
Bq2	$\≃$	similar, equals; asymptotically equal to
Bq3	$\≅$	congruent with; similar to
Bq4	$\≈$	approximate; asymptotic
Bq5	$\≊$	approximate, equals; asymptotic or equal to
Bq6	$\≋$	triple tilde; approximately identical to
Bq7	$\∽$	reverse mainline tilde; reverse similar
Bq8	$\⋍$	reverse similar, equals
Bq9	$\≌$	reverse congruent
Bqa	$\∋$	contains; owns; includes
Bqc	$\⊃$	superset; properly includes in set; implies
Bqd	$\⊇$	superset, equals; ident.with or contains as subset
Bqg	$\⫆$	superset, double equals
Bqj	$\⋑$	double superset
Bqk	$\⊐$	square superset; original of
Bql	$\⊒$	square superset, equals
Bqm	$\?$	equal, questionmark
Bqn	$\ˆ$	circle, equals
Bqo	$\ė$	equals, dot above; approaches the limit
Bqp	$\≑$	equals, even dots; approximately equal
Bqq	$\≙$	estimates; corresponds to
Bqr	$\≜$	triangle, equal; equal by definition
Bqs	$\≖$	circle in equals sign
Bqt	$\≔$	colon, equals; is defined as
Bqu	$\≕$	equals, colon; defines
Bqv	$\⩷$	equal, double dot above and under
Bqw	$\&z.defas;$	defined as
Bqx	$\≡$	equivalent; identical with; triple equals
Bqy	$\≓$	equal, rising dots
Bqz	$\≒$	equals, falling dots; appr. equal to; image of
Br1	$\≁$	not similar; not equivalent to
Br2	$\≄$	not similar, equals; not asymptotically equal to
Br3	$\≇$	not congruent with; neither appr. nor act. equal
Br4	$\≉$	not approximate; not asymptotic to
Br6	$\≋̸$	not approximately, double; dashed triple tilde
Bra	$\∌$	does not contain as a member
Brc	$\⊅$	not superset; does not properly include in set
Brd	$\⊋$	superset, not equals
Bre	$\&z.nsupne;$	not superset, not equals
Brf	$\⊉$	not superset, equals; does not contain as subset
Brg	$\⫌$	superset, not double equals
Brh	$\&z.nsupE;$	not superset, double equals
Bri	$\⫆̸$	not superset, double equals
Brk	$\&z.sqnsup;$	square not superset
Brl	$\&z.sqnrsp;$	square not reflex superset
Brm	$\&z.sqspne;$	square superset, not equal

Coordinate	Content	Description
Brn	<code>&z.nbump;</code>	not isomorphic
Bro	<code>&not;</code>	logical not sign
Brp	<code>&bumpe;</code>	bumpy equals, equals; approximately equal to
Brq	<code>&z.Ehac;</code>	equiangular; equals with hacek
Brr	<code>&bump;</code>	bumpy equals; geometrically equiv. to; appr. equal
Brs	<code>&asymp;</code>	cupcap; asymptotically equal to
Brt	<code>&becaus;</code>	because
Bru	<code>&there4;</code>	therefore
Brv	<code>&ne;</code>	not equal to
Brw	<code>&z.nasymp;</code>	not asymptotically equivalent
Brx	<code>&nequiv;</code>	not equivalent, not identical with
Brz	<code>&z.simne;</code>	approximately but not actually equal to
Bs1	<code>&emptyv;</code>	solidus in circle; empty set; null set; diameter
Bs2	<code>&oast;</code>	circled asterisk
Bs3	<code>&z.plims;</code>	circle and long bar; Plimsoll sign
Bs4	<code>&z.xhair;</code>	crosshairs; circle and (big) plus sign
Bs6	<code>&minusb;</code>	minus sign in box
Bs7	<code>&plusb;</code>	plus sign in box
Bs8	<code>&timesb;</code>	multiplication sign in box
Bsa	<code>&times;</code>	multiplication sign
Bsb	<code>&z.Times;</code>	vector multiplication
Bsc	<code>&middot;</code>	center dot
Bsd	<code>&ltimes;</code>	times sign, left closed
Bse	<code>&rtimes;</code>	times sign, right closed
Bsf	<code>&bowtie;</code>	bowtie
Bsg	<code>&rthree;</code>	right three times
Bsh	<code>&lthree;</code>	left three times
Bsi	<code>&wreath;</code>	wreath product
Bsk	<code>&z.odiv;</code>	circle divide
Bsl	<code>&odash;</code>	circled dash; hyphen in circle
Bsm	<code>&osol;</code>	solidus in circle
Bsn	<code>&ocir;</code>	open dot in circle
Bso	<code>&odot;</code>	middle dot in circle; sun-symbol; Tensor product
Bsp	<code>&ominus;</code>	minus sign in circle; symmetric difference
Bsq	<code>&ovbar;</code>	circle, and vertical bar
Bsr	<code>&oplus;</code>	plus sign in circle; direct sum; earth sign
Bss	<code>&otimes;</code>	multiplication sign in circle; direct product
Bst	<code>&z.oplusl;</code>	semi-direct sum
Bsu	<code>&z.otimsl;</code>	semi-direct product
Bsv	<code>&z.oplusr;</code>	semi-direct sum
Bsw	<code>&z.otimsr;</code>	semi-direct product
Bta	<code>&doplus;</code>	plus sign, dot below; tight dotted plus
Btb	<code>&plusdo;</code>	plus sign, dot above; direct sum
Btc	<code>&plusmn;</code>	plus or minus sign
Btd	<code>&mnplus;</code>	minus or plus sign
Bte	<code>&hercon;</code>	hermitian conjugative matrix

Coordinate	Content	Description
Btf	⋇	division on times
Btl	−	minus sign
Btm	&dminus;	minus with dot beneath; tight dotted minus
Btn	∸	minus with dot above; symmetric difference
Bto	÷	division sign
Btp	∺	geometric properties
Btq	–	en dash (long hyphen), copymarked 1/N
Btr	—	em dash, copymarked 1/M
Bts	&z.minhat;	minus with hat
Btt	∷	four dots in square; as
Btu	⊴	left triangle, equal
Btv	⊵	right triangle, equal
Btw	⋬	not left triangle, equals
Btx	⋭	not right triangle, equals
Bu0	∅	slashed zero; empty set
Buc	<ac>C</ac><ac>&z.xl;</ac>	Cambrian (era)
Bug	ℏ	Planck's constant (italic)
Buh	ℏ	Planck constant; h-bar (Dirac)
Buk	ℓ	roman script-l
Buw	<a><ac>A</ac><ac>˚</ac>	angstrom
CAa	´	acute (accent)
CAb	`	grave (accent)
CAc	˝	double acute (accent)
CAd	ˆ	circumflex, C caret (accent)
CAe	¨	double dot, umlaut, diaeresis (accent)
CAg	˚	circle (accent)
CAh	&z.Trkhhk;	Turkish hook (accent)
CAi	˜	tilde (accent)
CAj	˘	breve (accent)
CAk	ˇ	Hacek (Czech.), caron, wedge (accent)
CAl	¸	cedilla (accent)
CAm	¯	overbar, macron (accent)
CAn	&z.bigdot;	big dot above (accent)
CAo	˙	dot above (accent)
CAp	&z.tDot;	triple dot (accent)
CAq	⃜	quadruple dot (accent)
CAX	˛	polish hook, Ogonek (accent)
CAy	&z.shts/s;	short slash (overlay)
CAz	&z.cans/s;	cancellation slash (overlay)
CB1	э	eh – Cyrillic –
CB2	i	Ukrainian i – Cyrillic–
CB3	й	ee kratkoyeh – Cyrillic–
CB4	ь	myakhky znak – Cyrillic–
CB5	ю	u – Cyrillic–

Coordinate	Content	Description
CB6	ъ	tvjordyy znak – Cyrillic–
CB7	&zncy;	zheh – Cyrillic–
CBa	a	ah – Cyrillic–
CBb	б	beh – Cyrillic–
CBc	ц	tseh – Cyrillic–
CBd	д	deh – Cyrillic–
CBe	e	yeh – Cyrillic–
CBf	ф	ef – Cyrillic–
CBg	г	geh – Cyrillic–
CBh	x	khah – Cyrillic–
CBi	и	ee – Cyrillic–
CBj	я	yah – Cyrillic–
CBk	к	kah – Cyrillic–
CBl	л	el – Cyrillic–
CBm	м	em – Cyrillic–
CBn	н	en – Cyrillic–
CBo	o	aw – Cyrillic–
CBp	п	peh – Cyrillic–
CBq	х	tchek – Cyrillic–
CBr	p	ehr – Cyrillic–
CBs	c	es – Cyrillic–
CBt	т	teh – Cyrillic–
CBu	y	oo – Cyrillic–
CBv	в	veh – Cyrillic–
CBw	щ	shchah – Cyrillic–
CBx	ш	shah – Cyrillic–
CBY	ы	yery – Cyrillic–
CBz	з	zeh – Cyrillic–
CC1	Э	Eh – Cyrillic –
CC2	I	Ukrainian I – Cyrillic –
CC3	Й	Ee kratkoyeh – Cyrillic –
CC4	Ь	Myakhkyy znak – Cyrillic –
CC5	Ю	U – Cyrillic –
CC6	Ъ	Tvyordyy znak – Cyrillic –
CC7	Ж	Zheh – Cyrillic –
CCa	A	Ah – Cyrillic –
CCb	Б	Beh – Cyrillic –
CCc	Ц	Tseh – Cyrillic –
CCd	Д	Deh – Cyrillic –
CCe	E	Yeh – Cyrillic –
CCf	Ф	Ef – Cyrillic –
CCg	Г	Geh – Cyrillic –
CCh	X	Khah – Cyrillic –
CCi	И	Ee – Cyrillic –
CCj	Я	Yah – Cyrillic –
CCK	К	Kah – Cyrillic –

Coordinate	Content	Description
CCl	Л	El – Cyrillic –
CCm	M	Em – Cyrillic –
CCn	H	En – Cyrillic –
CCo	O	Aw – Cyrillic –
CCp	П	Peh – Cyrillic –
CCq	Х	Tchek – Cyrillic –
CCr	P	Ehr – Cyrillic –
CCs	C	Es – Cyrillic –
CCt	T	Teh – Cyrillic –
CCu	У	Oo – Cyrillic –
CCv	B	Veh – Cyrillic –
CCw	Щ	Shchah – Cyrillic –
CCx	Ш	Shah – Cyrillic –
CCy	Ы	Yery – Cyrillic –
CCz	З	Zeh – Cyrillic –
CD0	℩	inverted iota – Greek –
CD2	ϖ	physicians' pi – Greek –
CD3	ϵ	epsilon (cursive) – Greek –
CD4	ϕ	phi (cursive,open) – Greek –
CD5	ϝ	digamma
CD6	∂	curly d; differential – Greek –
CD7	&z.betav;	curly beta – Greek –
CD8	ϰ	kappa (cursive,rounded) – Greek –
CD9	ϱ	rho (cursive, round) – Greek –
CDa	α	alpha – Greek –
CDb	β	beta – Greek –
CDc	χ	chi – Greek –
CDd	δ	delta – Greek –
CDe	ε	epsilon (Porson) – Greek –
CDf	φ	phi – Greek –
CDg	γ	gamma – Greek –
CDh	η	eta – Greek –
CDi	ι	iota – Greek –
CDj	ϑ	theta (cursive, rounded) – Greek –
CDk	κ	kappa – Greek –
CDl	λ	lambda – Greek –
CDm	μ	mu – Greek –
CDn	ν	nu – Greek –
CDo	&omicr;	omicron – Greek –
CDp	π	pi – Greek –
CDq	θ	theta – Greek –
CDr	ρ	rho – Greek –
CDs	σ	sigma – Greek –
CDt	τ	tau – Greek –
CDu	&upsil;	upsilon – Greek –
CDv	ς	sigma (final) – Greek –

Coordinate	Content	Description
CDw	ω	omega – Greek –
CDx	ξ	xi – Greek –
CDy	ψ	psi – Greek –
CDz	ζ	zeta – Greek –
CE0	“	double quotation mark, left
CE1	∇	differential vector; nabla;
CE2	&z.mho;	mho
CE7	&z.lsguo;	open single guillemet
CE8	«	open double guillemet; angle open quote
CE9	‘	single quotation mark, left
CEa	A	capital alpha – Greek –
CEb	B	capital beta – Greek –
CEc	X	capital chi – Greek –
CEd	Δ	delta (capital); increment – Greek –
CEe	E	capital epsilon – Greek –
CEf	Φ	phi (capital) – Greek –
CEg	Γ	gamma (capital) – Greek –
CEh	H	capital eta – Greek –
CEi	I	capital iota – Greek –
CEj	&z.Theta;	Theta (capital, round)
CEk	K	capital kappa – Greek –
CEl	Λ	lambda (capital) – Greek –
CEm	M	capital mu – Greek –
CEn	N	capital nu – Greek –
CEo	O	capital omicron – Greek –
CEp	Π	pi (capital) – Greek –
CEq	Θ	theta (capital) – Greek –
CEr	P	capital rho – Greek –
CEs	Σ	sigma (capital) – Greek –
CEt	T	capital tau – Greek –
CEu	Υ	upsilon (capital) – Greek –
CEw	Ω	omega (capital) – Greek –
CEx	Ξ	xi (capital) – Greek –
CEy	Ψ	psi (capital) – Greek –
CEz	Z	capital zeta – Greek –
CF0	”	double quotation mark, right
CF7	&z.rsquo;	close single guillemet
CF8	»	close double guillemet; angle close quote
CF9	’	single quotation mark, right
CFa	æ	ligature ae
CFb	Æ	ligature AE
CFc	<ac>d</ac><ac>z.xl</ac>	crossed l.c. d
CFd	<ac>D</ac><ac>z.xl</ac>	crossed cap. D
CFe	œ	ligature oe

Coordinate	Content	Description
CFf	Œ	ligature OE
CFh	ı	undotted l.c. i
CFi	&jnodot;	undotted l.c. j
CFl	<ac>l</ac><ac>&z.xl</ac>	crossed l.c. l
CFm	<ac>L</ac><ac>&z.xl</ac>	crossed cap. L
CFo	ø	small o, slashed
CFp	Ø	capital O, slashed
CFs	ß	es-zet (German)
CFu	&z. ausco;	a-underscore
CFv	&z. ousco;	o-underscore
CGe	¡	inverted exclamation mark (Spanish)
CGq	¿	inverted question mark (Spanish)
CHa	ℵ	Aleph (Hebrew)
CHb	ℶ	Beth (Hebrew)
CHc	ℸ	Daleth (Hebrew)
CHd	ℷ	Gimel (Hebrew)
CJb	<sc>B</sc>	B Bernoulli function
CJh	<sc>H</sc>	H Hamiltonian
CJl	<sc>L</sc>	L Lagrangian
CJm	<sc>M</sc>	M physics M-matrix
CJo	<sc>O</sc>	O order of
Pa0	<ac>&z.glst</ac><ac>&z.bar</ac>	glottal stop, barred (phonetic symbol)
Pa1	&z.glst;	glottal stop (phonetic symbol)
Pa2	&z.sbbrg;	subscript bridge (phonetic symbol)
Pa3	&z.lam;	laminal (phonetic symbol)
Pa5	&z.sbbrgt;	subscript bridge, turned (phonetic symbol)
Pa6	&z.aacute;	extra high, accent (phonetic symbol)
Pa7	&z.xhighs;	extra high, symbol (phonetic symbol)
Pa8	&z.ht;	hooktop (phonetic symbol)
Paa	&z.pa;	lower-case a (phonetic symbol)
Pab	b	lower-case b (phonetic symbol)
Pac	c	lower-case c (phonetic symbol)
Pad	d	lower-case d (phonetic symbol)
Pae	e	lower-case e (phonetic symbol)
Paf	f	lower-case f (phonetic symbol)
Pag	&z.pg;	lower-case 'script' g (phonetic symbol)
Pah	h	lower-case h (phonetic symbol)
Pai	i	lower-case i (phonetic symbol)
Paj	j	lower-case j (phonetic symbol)
Pak	k	lower-case k (phonetic symbol)
Pal	l	lower-case l (phonetic symbol)
Pam	m	lower-case m (phonetic symbol)
Pan	n	lower-case n (phonetic symbol)

Coordinate	Content	Description
Pao	o	lower-case o (phonetic symbol)
Pap	p	lower-case p (phonetic symbol)
Paq	q	lower-case q (phonetic symbol)
Par	r	lower-case r (phonetic symbol)
Pas	s	lower-case s (phonetic symbol)
Pat	t	lower-case t (phonetic symbol)
Pau	u	lower-case u (phonetic symbol)
Pav	v	lower-case v (phonetic symbol)
Paw	w	lower-case w (phonetic symbol)
Pax	x	lower-case x (phonetic symbol)
Pay	y	lower-case y (phonetic symbol)
Paz	z	lower-case z (phonetic symbol)
Pb0	<ac>&z.inglst;/ac><ac>&z.xl;/ac>	inverted glottal stop, crossed (phonetic symbol)
Pb1	&z.inglst;	inverted glottal stop (phonetic symbol)
Pb2	&z.raisi;	raising sign (phonetic symbol)
Pb3	&z.trgull;	seagull, turned (phonetic symbol)
Pb4	<ac>2</ac><ac>&z.xl;/ac>	crossed 2 (phonetic symbol)
Pb5	&z.bar;	bar (phonetic symbol)
Pb6	&z.ggrave;	extra low, accent (phonetic symbol)
Pb7	&z.xlows;	extra low, symbol (phonetic symbol)
Pb8	&z.ctli;	curly tail (phonetic symbol)
Pba	&z.trna;	turned a (phonetic symbol)
Pbb	<a><ac>b</ac><ac>&z.ht;/ac>	b hooktop (phonetic symbol)
Pbc	<a><ac>c</ac><ac>ˇ/ac>	c wedge (phonetic symbol)
Pbd	<a><ac>d</ac><ac>&z.ht;/ac>	d hooktop (phonetic symbol)
Pbe	&z.schwa;	schwa (phonetic symbol)
Pbg	<a><ac>&z.pg;/ac><ac>&z.ht;/ac>	g hooktop (phonetic symbol)
Pbh	<ac>h</ac><ac>&z.xl;/ac>	crossed h (phonetic symbol)
Pbi	<ac>i</ac><ac>&z.bar;/ac>	barred i (phonetic symbol)
Pbj	<a><ac>jnodot</ac><ac>ˇ/ac>	j wedge (phonetic symbol)
Pbk	<a><ac>k</ac><ac>&z.ht;/ac>	k hooktop (phonetic symbol)
Pbl	<ac>l</ac><ac>&z.bar;/ac>	barred l (phonetic symbol)
Pbm	&z.ltlmr;	m with leftward tail at right (phonetic symbol)
Pbn	<a><ac>n</ac><ac>˜/ac>	tilde n (phonetic symbol)

Coordinate	Content	Description
Pbo	⊙	bull's eye (phonetic symbol)
Pbp	þ	thorn (phonetic symbol)
Pbr	&z.fhr;	fish-hook r (phonetic symbol)
Pbs	<a><ac>s</ac><ac>ˇ</ac>	s wedge (phonetic symbol)
Pbt	<a><ac>t</ac><ac>&z.palhi</ac>	left-hook t (phonetic symbol)
Pbu	<ac>u</ac><ac>&z.bar;</ac>	barred u (phonetic symbol)
Pbv	&z.pscrvi;	script v (phonetic symbol)
Pbw	&z.invw;	inverted w (phonetic symbol)
Pbx	χ	chi (phonetic symbol)
Pby	&z.trny;	turned y (phonetic symbol)
Pbz	<a><ac>z</ac><ac>ˇ</ac>	z wedge (phonetic symbol)
Pc0	<ac>&z.reglst;</ac><ac>&z.bar;</ac>	glottal stop reversed, barred (phonetic symbol)
Pc1	&z.reglst;	reversed glottal stop (phonetic symbol)
Pc2	&z.low;	lowering sign (phonetic symbol)
Pc3	&z.sbw;	subscript w (phonetic symbol)
Pc5	&z.xl;	cross, short horizontal line (phonetic symbol)
Pc6	&z.hris;	high rising, accent (phonetic symbol)
Pc7	&z.hriss;	high rising, symbol (phonetic symbol)
Pca	&z.pscra;	script a (phonetic symbol)
Pcb	<scpb></scpb>	small capital B (phonetic symbol)
Pcc	<ac>c</ac><ac>¸</ac>	c cedilla (phonetic symbol)
Pcd	&z.rtdl;	right-tail d (phonetic symbol)
Pce	<a><ac>&z.schwa;</ac><ac>&z.rh;</ac>	right-hook schwa (phonetic symbol)
Pcg	<scpg></scpg>	small capital G (phonetic symbol)
Pch	<a><ac>h</ac><ac>&z.ht;</ac>	h hooktop (phonetic symbol)
Pci	ι	iota (phonetic symbol)
Pcj	<ac>&jnodot;</ac><ac>&z.bar;</ac>	barred dotless j (phonetic symbol)
Pck	&z.trnk;	turned k (phonetic symbol)
Pcl	&z.btldl;	belted l (phonetic symbol)
Pcm	&z.trnm;	turned m (phonetic symbol)
Pcn	&z.ltl;n;	n with left tail at left (phonetic symbol)
Pco	<ac>o</ac><ac>&z.bar;</ac>	barred o (phonetic symbol)
Pcp	Þ	THORN (phonetic symbol)
Pcr	&z.rl;	r with long leg (phonetic symbol)
Pcs	&z.rtls;	s with right tail (phonetic symbol)
Pct	&z.rtl;t;	t with right tail (phonetic symbol)

Coordinate	Content	Description
Pcu	&z.pupsil;	upsilon (phonetic symbol)
Pcy	<scp>y</scp>	small capital Y (phonetic symbol)
Pcz	<ac>z</ac><ac>&z.ctl</ac>	curly-tail z (phonetic symbol)
Pd1	!	exclamation point (phonetic symbol)
Pd2	&z.verts;	vertical stroke (superior) (phonetic symbol)
Pd3	&z.hbar;	horizontal bar (phonetic symbol)
Pd6	&z.lris;	low rising, accent (phonetic symbol)
Pd7	&z.lriss;	low rising, symbol (phonetic symbol)
Pda	&z.trnsa;	turned script a (phonetic symbol)
Pdb	β	beta (phonetic symbol)
Pdc	<ac>c</ac><ac>&z.ctl</ac>	curly-tail c (phonetic symbol)
Pdd	&z.dyogh;	d-Yogh ligature (phonetic symbol)
Pde	&z.reve;	reversed e (phonetic symbol)
Pdg	&z.pgamm;	gamma (phonetic symbol)
Pdh	<a><ac>&z.heng</ac><ac>&z.ht</ac>	heng hooktop (phonetic symbol)
Pdi	<scp>i</scp>	small capital I (phonetic symbol)
Pdj	<ac><a><ac>&jnodot</ac><ac>&z.ht</ac></ac><ac>&z.bar</ac>	dotless j, bar hooktop (phonetic symbol)
Pdk	&z.resmck;	small capital K, reversed (phonetic symbol)
Pdl	&z.rttl;	l with right tail (phonetic symbol)
Pdm	&z.trnmlr;	turned m with long right leg (phonetic symbol)
Pdn	&z.eng;	eng (phonetic symbol)
Pdo	ø	slashed o (phonetic symbol)
Pdp	<a><ac>p</ac><ac>&z.ht</ac>	p hooktop (phonetic symbol)
Pdr	&z.rtlr;	r with right tail (phonetic symbol)
Pds	&z.esh;	esh (phonetic symbol)
Pdt	&z.tesh;	t-esh ligature (phonetic symbol)
Pdu	<scp>u</scp>	small capital U (phonetic symbol)
Pdz	&z.rtlz;	z with right tail (phonetic symbol)
Pe1	—	pipe (phonetic symbol)
Pe2	&z.verti;	vertical stroke (inferior) (phonetic symbol)
Pe3	&z.gull;	seagull (phonetic symbol)
Pe6	&z.risfla;	rising-falling, accent (phonetic symbol)
Pe7	&z.risfls;	rising-falling, symbol (phonetic symbol)
Pea	æ	ash (phonetic symbol)
Peb	<ac>b</ac><ac>&z.xl</ac>	crossed b (phonetic symbol)
Pec	∁	stretched c (phonetic symbol)
Ped	ð	eth (phonetic symbol)
Pee	<scp>e</scp>	small capital E (phonetic symbol)
Peg	&z.pbgam;	baby gamma (phonetic symbol)
Peh	&z.trnh;	turned h (phonetic symbol)

Coordinate	Content	Description
Pei	ı	i, undotted (phonetic symbol)
Pej	<ac>j</ac><ac>&z.ctl;</ac>	curly-tail j (phonetic symbol)
Pel	&z.lyogh;	l-Yogh ligature (phonetic symbol)
Pem	M	capital M (phonetic symbol)
Pen	&z.rtl;n;	n with right tail (phonetic symbol)
Peo	œ	o-e ligature (phonetic symbol)
Pep	&z.pphi;	phi (phonetic symbol)
Per	&z.trnr;	turned r (phonetic symbol)
Pes	<ac>&z.esh;</ac><ac>&z.ctl;</ac>	curly-tail esh (phonetic symbol)
Pet	&z.trnt;	turned t (phonetic symbol)
Pez	&z.yogh;	yogh (phonetic symbol)
Pf1	/	slash (phonetic symbol)
Pf2	&z.syllab;	syllabicity mark (phonetic symbol)
Pf3	&z.atr;	advanced tongue root (phonetic symbol)
Pf7	&z.highs;	high, symbol (phonetic symbol)
Pfa	<scp>a</scp>	small capital A (phonetic symbol)
Pfc	<a><ac>c</ac><ac>&z.ht;</ac>	c hooktop (phonetic symbol)
Pfd	Ð	ETH (phonetic symbol)
Pfe	ϵ	epsilon (phonetic symbol)
Pfg	<a><ac><scp>g</scp></ac><ac>&z.ht;</ac>	G small cap hooktop (phonetic symbol)
Pfh	H	capital H (phonetic symbol)
Pfj	&jnodot;	j, undotted (phonetic symbol)
Pfl	L	capital L (phonetic symbol)
Pfn	<scp>n</scp>	small capital N (phonetic symbol)
Pfo	Œ	small capital O-E ligature (phonetic symbol)
Pfr	&z.rtrtrnr;	turned r with right tail (phonetic symbol)
Pfs	&z.reshtl;	esh reversed, top loop (phonetic symbol)
Pft	θ	theta (phonetic symbol)
Pfz	<ac>&z.yogh;</ac><ac>&z.ctl;</ac>	curly-tail yogh (phonetic symbol)
Pg1	&z.Barpip;	double-barred pipe (phonetic symbol)
Pg2	⌝	corner (phonetic symbol)
Pg3	&z.rtr;	retracted tongue root (phonetic symbol)
Pg7	&z.mids;	mid, symbol (phonetic symbol)
Pga	&z.invv;	inverted v (phonetic symbol)
Pgd	<ac>d</ac><ac>&z.xl;</ac>	crossed d (phonetic symbol)
Pge	&z.repsiv;	reversed epsilon (phonetic symbol)
Pgh	&z.hrttrh;	turned h, hook right tail (phonetic symbol)
Pgl	&lambd;	lambda (phonetic symbol)
Pgn	&z.nlr;	n, long right leg (phonetic symbol)
Pgo	&z.openo;	open o (phonetic symbol)

Coordinate	Content	Description
Pgr	&z.trnrl;	turned longlegged r (phonetic symbol)
Pgt	<a><ac>t</ac><ac>&z.hti</ac>	t hooktop (phonetic symbol)
Pgz	&z.btyogh;	yogh, bent tail (phonetic symbol)
Ph1	≠	double-barred slash (phonetic symbol)
Ph2	&z.hlmrk;	half-length mark (phonetic symbol)
Ph7	&z.lows;	low, symbol (phonetic symbol)
Pha	<a><ac>&z.pscra;</ac><ac>&z.rhi</ac>	script a, right hook (phonetic symbol)
Phd	<ac>D</ac><ac>&z.xli</ac>	crossed D (phonetic symbol)
Phe	<a><ac>&z.repsivi</ac><ac>&z.rhi</ac>	right hook reversed epsilon (phonetic symbol)
Phh	&z.hvlig;	h-v ligature (phonetic symbol)
Phl	<ac>λ</ac><ac>&z.xli</ac>	lambda, crossed (phonetic symbol)
Phn	<ac>n</ac><ac>&z.ctli</ac>	curly-tail n (phonetic symbol)
Pho	ω	lower-case omega (phonetic symbol)
Phr	<scp>r</scp>	small capital R (phonetic symbol)
Pht	<ac>t</ac><ac>&z.ctli</ac>	curly-tail t (phonetic symbol)
Pi1	∥	double Pipe (phonetic symbol)
Pi2	&z.lmrk;	length mark (phonetic symbol)
Pi7	&z.riss;	rising, symbol (phonetic symbol)
Pid	<ac>d</ac><ac>&z.ctli</ac>	curly-tail d (phonetic symbol)
Pie	&z.crepsv;	closed reversed epsilon (phonetic symbol)
Pih	&z.heng;	heng (phonetic symbol)
Pio	&z.clomeg;	closed omega (phonetic symbol)
Pir	<scp>&z.pinvR</scp>	inverted small capital R (phonetic symbol)
Pj1	&z.pSlash;	double Slash (phonetic symbol)
Pj2	’	apostrophe (phonetic symbol)
Pj7	&z.fals;	falling, symbol (phonetic symbol)
Pje	<a><ac>&epsivi</ac><ac>&z.rhi</ac>	epsilon, upper right hook (phonetic symbol)
Pjo	<a><ac>&z.openo;</ac><ac>&z.rhi</ac>	open o, upper right hook (phonetic symbol)
Pjr	&z.refhr;	fish-hook r, reversed (phonetic symbol)
Pk1	&z.trisla;	triple Slash (phonetic symbol)
Pk2	&z.reapos;	reversed apostrophe (phonetic symbol)
Pko	&z.trnomeg;	inverted omega (phonetic symbol)
Pkr	&z.rtrfhr;	reversed fish-hook r, right tail (phonetic symbol)
Pl1	&z.sbs;	small backslash (phonetic symbol)
Pl2	‘	turned comma (phonetic symbol)
Plr	&z.refhrl;	reversed fish-hook r, long leg (phonetic symbol)

Coordinate	Content	Description
Pm2	&z.sblhr;	left half-ring (phonetic symbol)
Pn2	&z.sbrhr;	right half-ring (phonetic symbol)
Po2	&z.palh;	palatization hook (phonetic symbol)
Pp2	&z.rh;	right hook (phonetic symbol)
Pq2	&z.rndcap;	round cap (phonetic symbol)
Pq3	&z.mdc;	mid centralized (phonetic symbol)
Pr2	&z.archs;	subscript arch (phonetic symbol)
Ps2	&z.toplig;	top ligature (phonetic symbol)
Pt2	&z.btmlig;	bottom ligature (phonetic symbol)

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