

# The `amsrefs` package

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## 1 Introduction

The `amsrefs` package is a  $\LaTeX$  package for bibliographies that provides an archival data format similar to the format of `BibTeX` database files, but adapted to make direct processing by  $\LaTeX$  easier. The package can be used either in conjunction with `BibTeX` or as a replacement for `BibTeX`.

As compared to the standard methods for putting a bibliography into a  $\LaTeX$  document (running `BibTeX` to extract selected items from a `.bib` database into a formatted `.bbl` file), the chief advantages of the `amsrefs` package for an author or for someone writing a document class are as follows:

**Preservation of structure** The internal structural information of the bibliography entries is not lost when they are imported from the database file into the  $\LaTeX$  document. This takes on its greatest significance when archiving documents in  $\LaTeX$  form or transmitting them to another user (such as a publisher).

**Deferred formatting** This means that the style of the bibliography can be readily changed without reimporting everything from the original database(s).

**More natural handling of titles** Proper nouns do not need to have braces added to prevent capitalization problems.

**Less ambiguous format for author names** When author names are given in inverted order (last name first) it is possible for  $\LaTeX$  to unambiguously identify the last name without any further markup, even in cases like Saunders Mac Lane (Mac Lane, Saunders) versus Stephen H. Lane (Lane, Stephen H.), or Cam Van Tran (Tran, Cam Van) versus Bert Van Keulen (Van Keulen, Bert) that require the addition of extra braces in `BibTeX`.

**Setup requires only  $\LaTeX$  knowledge** All bibliography setup can be done in  $\LaTeX$ ; learning another programming language (such as, the one used in `BibTeX` `bst` files) is unnecessary.

**Self-printable database files** A  $\LaTeX$  document that contains only a bibliography in `amsrefs` forms can be used as a database for exporting entries to other documents. And because it is a  $\LaTeX$  document, the database

can be printed directly at any time simply by running it through L<sup>A</sup>T<sub>E</sub>X in the usual way.

**Self-contained** In many cases it seems possible to do without BibT<sub>E</sub>X entirely. For example, if the entries are extracted from a single database file that is maintained in sorted order, the bibliography can be printed directly by L<sup>A</sup>T<sub>E</sub>X on the first pass and the citations resolved on the second pass.

## 2 Using the `amsrefs` package

There are three main ways of using the `amsrefs` package:

1. Using the standard `\bibliography` command to import a `.bbl` file that was created by BibT<sub>E</sub>X with the `amsxport` bibliography style.
2. Using the `\bibselect` command. This is similar to using `\bibliography`, but with an extension of `.ltx` (“L<sup>A</sup>T<sub>E</sub>X bibliography”) for database files, rather than `.bib`, and with the extraction of the selected entries being done by L<sup>A</sup>T<sub>E</sub>X itself on the first pass.
3. Writing bibliography items in `amsrefs` form directly into your L<sup>A</sup>T<sub>E</sub>X document.

### 2.1 Using the `amsrefs` package with BibT<sub>E</sub>X

When BibT<sub>E</sub>X is used to generate a bibliography for use with the `amsrefs` package, your main document will look almost exactly the same as usual, with the `\bibliography` command used in the normal way. The only overt difference would be one line at the beginning to load the `amsrefs` package. The bibliography style to use would be a generic one called `amsxport` (see the `amsxport` documentation for more details).

```
\documentclass{article}
\usepackage{amsrefs}
...
\begin{document}
...
\bibliographystyle{amsxport}
\bibliography{bib-file-name}
```

If you look at the `.bbl` file generated by BibT<sub>E</sub>X, you will see that there are two main differences:

1. Instead of a `thebibliography` environment, the bibliography is wrapped in two environments:

```
\begin{bibdiv}
\begin{biblist}
...
\end{biblist}
\end{bibdiv}
```

2. Each entry in the bibliography is done with `\bib` instead of `\bibitem`, as discussed below in more detail.

## 2.2 Using `\bibselect` instead of `\bibliography`

One feature of the `amsrefs` package is the possibility of maintaining your bibliography data in the form of a  $\LaTeX$  document that can be directly printed, and using  $\LaTeX$  itself instead of `BibTeX` for importing cited items into other documents. If you write

```
\bibselect{combinatorics}
```

instead of `\bibliography{combinatorics}`, then  $\LaTeX$  will look for a file `combinatorics.ltb` (instead of `combinatorics.bib`), and search through it for a `biblist` environment. The `\bib` entries in the list will be checked to see if they match `\cite` commands in the calling document, and if so they will be copied into a `.bbl` file.

Because this is all being handled by  $\LaTeX$ , the contents of the bibliography can be printed on the first pass; cite numbers are resolved, consequently, on the second pass.

When `\bibselect` is used, the `\bibliographystyle` command is irrelevant since its purpose is merely to pass information to `BibTeX`.

There is one significant difference with the `\bibselect` command: it produces only the actual contents of the bibliography, without the section title and without any bibliography environment wrapper. This is to make it possible to put them in your main document and freely customize them there, including (for example) putting some introductory text at the beginning of the bibliography. In other words, you can write something like

```
\begin{bibchapter}[Annotated Bibliography]
(Some introductory text here.)
\begin{biblist}
\bibselect{combinatorics}
\end{biblist}
\end{bibchapter}
```

The `\bibselect` command always regenerates the `.bbl` file unless the `\nofiles` switch is used. When a time comes that you no longer want it to be regenerated, comment out the `\bibselect` command and copy the `bbl` file into your  $\LaTeX$  file. This is particularly relevant if you put any line break or page break commands into the bibliography.

## 2.3 Direct entry of bibliography items

When the bibliography is written by hand each entry is written with `\bib` instead of `\bibitem`, and has the form

```
\bib{BW}{article}{
  author={Bertram, A.},
  author={Wentworth, R.},
  title={Gromov invariants for holomorphic maps on Riemann
    surfaces},
  date={1996},
  journal={J. Amer. Math. Soc.},
  volume={9},
  number={2},
```

```

    pages={529\ndash 571},
}

```

The first and second arguments give the citation key and type; the remainder is a list of bibliographic field names and field values in more or less standard L<sup>A</sup>T<sub>E</sub>X key-value syntax. The syntax for `\bib` is intentionally restricted, however, to eliminate certain variations—such as omitting the braces around the value—that are not really a good idea when the values can contain arbitrary L<sup>A</sup>T<sub>E</sub>X text.

If you try leaving out an equal sign or the comma at the end of a line, you will see that the warning messages for syntax errors usually identify the type and location of the error precisely enough that making the corrections is straightforward. (For more details see the documentation of the `rkeyval` package.)

### 3 Package options

The recognized options for `amsrefs` include:

? Informational option. This causes L<sup>A</sup>T<sub>E</sub>X to produce some extra informational messages in the L<sup>A</sup>T<sub>E</sub>X log, including a list of the package options.

**lite** Omit the loading of the auxiliary packages `textcmds` and `mathscinet` (they can still be loaded separately if that is what it takes to clear up timing problems). The `textcmds` package defines a number of short forms for various text symbols, which might lead to a name conflict with one of your own definitions, or (possibly) with another package.

**numeric,**

**alphabetic,**

**author-year** These three options switch between the three main bibliography styles supported “out of the box” by the `amsrefs` package. If you want anything significantly different, see Section 11. The **numeric** style is the default.

**short-journals** Print short form instead of full form for journal names. If the data contains only the short form, that of course is all you will get in either case.

**short-months** Print short version of month names (e.g., Jan. instead of January).

**initials** Print author/editor names with initials instead of full given name. This only affects the primary names for each entry; anything more complicated is considered a matter of variant style and must be specified in detail by whoever wants the different style—see Section 13.11.

**traditional-quotes,**

**logical-quotes** With the *traditional quotes* option (default), quotation marks produced by `\bibquotes` (Section 11.1) fall outside of other punctuation, “like this,” whereas with the *logical quotes* option the order is reversed, “like this”.

**sorted-cites,**

**non-sorted-cites,**

**non-compressed-cites,**

**compressed-cites** These four options apply only when the `numeric` option is in effect. They cause multiple cites written with `\cites` or `\citelist` to be sorted into numerical order and/or consecutive numbers (three or more) to be written in range form: [11,9,10,1,16,12] will be printed as [1,9–12,16] if both the `sorted-cites` and `compressed-cites` options are in effect. And by default they are.

**backrefs** This option causes “back-references” to be printed at the end of each bibliography entry to show where it was cited in the body of the document.

**sorted,**

**citation-order** Should the bbl file be compiled in sorted order or citation order? When using Bib<sub>T</sub>E<sub>X</sub>: don’t forget that changing this option will have no effect until after the next Bib<sub>T</sub>E<sub>X</sub> run. When importing from an `.ltx` file: No real sorting is done (at the time of this writing: 2002-02-27). You get whatever ordering was present in the `.ltx` file. The easiest way of working is therefore to maintain the `.ltx` file in sorted order.

**beta,**

**jpa** Obsolete; these applied only to the beta version of the `amsrefs` package.

#### 4 More about the `\bib` command

The `\bib` command is a drastically different replacement for the `\bibitem` command. Compare the example shown above as it would look if done with `\bibitem`:

```
\bibitem{BW} A. Bertram and R.~Wentworth,
  \emph{Gromov invariants for holomorphic maps on {R}iemann surfaces},
  J. Amer. Math. Soc. \textbf{9} (1996), no.~2, 529--571.
```

With the `\bib` command, the form of the data in the L<sup>A</sup>T<sub>E</sub>X document is fairly close to the form used in Bib<sub>T</sub>E<sub>X</sub> database files. There are, however, some significant differences.

**braces** Always use braces to enclose the value of each field (standard L<sup>A</sup>T<sub>E</sub>X syntax), never double quotes (Bib<sub>T</sub>E<sub>X</sub> allows both quotes and braces).

**repeated fields** Fields can be repeated (and should be, where applicable). In this example each author name is given separately. The task of combining the names as needed for the current publication is handled by L<sup>A</sup>T<sub>E</sub>X.

**inverted names** Author and editor names should be written uniformly in *Last, First* order. This is the form that provides the maximum flexibility with the least ambiguity and least extra markup. When printed, the names will be automatically uninverted in whatever manner is specified by the bibliography style in use. (For example, some styles have the first author’s name inverted and the remaining names not inverted.)

**capitalization** In titles, do not capitalize words that are not proper nouns. Capitalization will be applied automatically as needed.

(In contrast to Bib $\TeX$ , proper nouns do not need to be written with extra braces: you can simply write `Riemann` instead of `{R}iemann` or `{Riemann}`.)

**ndash** Use of `\ndash` instead of `--` for en-dashes is recommended (the `--` notation, which is tied to idiosyncrasies of the Computer Modern “ $\TeX$  text” font encoding, hinders document translation and the use of alternate fonts).

**date** It is recommended to use a `date` field to give the year of publication; although `year` is also accepted, `date` is more general. If the date includes a month, it is recommended to use numbers for months in ISO form, e.g., 1987-12. This allows month names to be printed in full or abbreviated at will. For “Winter”, “Spring”, “Summer”, “Fall”, either use month numbers of 13, 14, 15, 16 (respectively), or just put in the text before the year:

```
date={Summer 1987},
```

#### 4.1 Field names for the `\bib` command

The following field names are currently supported by the `amsrefs` package:

<code>author†</code>	<code>date</code>	<code>eprint</code>
<code>editor†</code>	<code>year*</code>	<code>preprint</code>
<code>isbn†</code>	<code>journal</code>	<code>edition</code>
<code>review†</code>	<code>volume</code>	<code>note</code>
<code>title</code>	<code>number</code>	<code>url</code>
<code>booktitle*</code>	<code>pages</code>	<code>type</code>
<code>series</code>	<code>part</code>	
<code>conference</code>	<code>issn</code>	<code>xref</code>
<code>publisher</code>	<code>doi</code>	<code>label</code>
<code>organization</code>	<code>language</code>	<code>setup</code>
<code>institution</code>	<code>hyphenation</code>	<code>name</code>
<code>place</code>		
<code>address*</code>	<code>status</code>	

The `†` indicates that a field is repeatable. The `*` indicates an alternative field name supported for compatibility with Bib $\TeX$ ; the field name just above a starred name is the equivalent provided by `amsrefs`. For example, the `date` field can contain not only the year but also month and day, if relevant, in ISO 8601 form: 1987-06-21. If month and/or day are present, they can be printed in different forms depending on the current bibliography style.

Although the meaning of many fields should be self-evident, for some of them explanatory remarks are in order.

**author** This field can be repeated. Multiple author names will be concatenated into a single field value. Names should be given in *Last, First* order (*von Last, First, Jr* for more complicated cases).

**date** This is a generalization of the `year` and `month` fields. Its value should be written in ISO 8601 format, e.g., 1987-06-05; but the day and month are omissible, so this can be used instead of the `year` field.

**doi** Digital Object Identifier

**edition** For books. If the value of this field is a simple number, `\bib` will convert it to cardinal form and add “ed.” (or alternative text if specified by the bibliography style). Otherwise it will be printed as is.

**editor** Like `author`; can be repeated.

**eprint** Electronic preprint information such as for `www.arXiv.org`. See `http://xxx.lanl.gov/help/faq/references` for recommended form.

**isbn** International Standard Book Number. Can be repeated.

**issn** International Standard Serial Number.

**language** Language of the work. The language name should be the printed form, not a Babel-style language name, since in principle this field could contain more complicated remarks such as “Russian, with French abstract”. Cf. `hyphenation`.

**hyphenation** This corresponds to the Babel package notion of ‘language’. The hyphenation language used for a given `\bib` entry is determined from various clues, which are checked in the following order:

1. The Babel language specified by the `hyphenation` field.
2. The Babel language specified by the *first word* of the `language` field (after lowercasing).
3. The current Babel language that was in effect before the `\bib` command started.
4. The current hyphenation patterns of the document, if there are no Babel language modules loaded.

**organization** The BibTeX documentation says that `institution` should be used for technical reports and `organization` for other entry types, whereas `school` should be used for theses. Having three different field names for these strikes me as overkill, so I omitted `school`.

**part** This is for a long journal article that is published in separate issues of the same journal.

**place** A synonym for address. Or to put it another way, `address` is supported as a BibTeX-compatible synonym for `place`.

**review** A review number or similar pointer, e.g., for Mathematical Reviews or Zentralblatt. Can be repeated.

**setup** This is a special field that can be used to give arbitrary commands to be executed at the beginning of the current `\bib` entry, after all the fields have been read. The idea is that one can alter the formatting of an individual entry through this field, to handle special cases.

**status** Typically used for notes such as “to appear” or “in preparation” with journal articles.

**subtitle** Typically used with a multipart journal article to give a subtitle for each part.

**translator** Like **author**; can be repeated.

**url** Universal Resource Locator.

**xref** This is used when cross-referring to another `\bib` entry. All of the fields of the xref'd entry are copied into the data of the current entry. If an article has a cross-reference to an entry of type `collection`, the collection title is imported into the article's `booktitle` field, not the `title` field.

## 4.2 Bibliography entry types

It behooves a bibliography package that has ambitions of serving for general use to support a rather wide range of entry types, e.g.,

<code>book</code>	<code>supplement</code>	<code>image</code>
<code>collection</code>	<code>fragment</code>	<code>artwork</code>
<code>series</code>	<code>review</code>	<code>map</code>
<code>set</code>	<code>play</code>	<code>audio</code>
<code>article</code>	<code>screenplay</code>	<code>music</code>
<code>periodical</code>	<code>personal</code>	<code>video</code>
<code>report</code>	<code>lecture</code>	<code>film</code>
<code>thesis</code>	<code>speech</code>	<code>software</code>
<code>manual</code>	<code>reading</code>	<code>miscellaneous</code>
<code>reference</code>	<code>story</code>	

The current release of `amsrefs` does not, however, provide support out of the box for all of the above types, but only the ones that are commonly used in AMS publications. On the other hand, adding support for a new type is scarcely any more work than modifying an existing type: in either case if you write down the desired output style in a `\BibSpec` command, voilà, the type is now supported. If it needs any unusual fields, you will need to define the extra field names as well, but adding a new field normally requires only one line, a `\DefineSimpleKey` statement (see the examples in `amsrefs.sty`).

Discussion of individual types:

**book** A written work by one or more authors where the authors share credit for the work as a whole.

**collection** A written work by multiple authors where distinct parts are credited to particular authors. This includes conference proceedings volumes. Collected works of a single author would also be classed as a collection, even though everything is written by the same person.

**series** A sequence of *books* or *collections* with a common series name given by the publisher. New releases are published as they become ready, rather than following a definite regular schedule (compare to *periodical*).

**set** Like *book* or *collection* but split into multiple volumes, where the volumes might be published either simultaneously or sequentially as they



are finished; as compared to *series*, a *set* has a more definite (usually pre-established) number of volumes, and is usually the work of a single author, or collaborating authors, rather than multiple independent authors. A set may consist of books, articles collections, reports, etc.—e.g., a multi-part article published over several issues of a journal can be classified as a set to facilitate citing it as a whole—but it would be unusual for a set to contain periodicals or series.

**article** A relatively short—usually less than 50 pages—written item that appeared as part of a periodical or collection; or, possibly, as a World Wide Web document, in which case the URL should be included in the citation info as well as the date on which it was read.

**periodical** Like a *series* of *collections* but following a definite schedule of publication, usually two times or more per year. This includes newspapers, magazines, and journals.

**report** Technical description, white paper, or the like. Similar to *article* but produced by the author(s) for a particular organization, usually their employer, whose primary business is usually not publishing.

**thesis** Like *report* but produced by the author for an educational institution to satisfy the requirements for a degree. Not (normally) produced by a commercial publisher for sale.

**manual** A special case of *book*: Instructions for dealing with a particular kind of software or manufactured product.

**reference** This could be considered as a general type subsuming indexes into various kinds of literature, dictionaries, and other kinds of books where items are looked up by name or title.

**story** Short story, longer story, fiction

**review** Like *article*, usually, but specifically to discuss some other citable item.

**personal** A personal communication in the form of mail, e-mail, phone call, face-to-face conversation, telegram, etc.; unlike most other cited items, personal communications are usually not available in libraries.

**lecture** This type provides for a kind of “publication” that consists primarily in the verbal presentation, or possibly in printed lecture notes given out at the time of the lecture. It is somewhat rare for these to have a formal publisher. A lecture might be published in audio or video form.

**speech** Political or academic address intended for persuasive rather than pedagogic purposes. A commencement address would not normally be considered a lecture.

**reading** A public reading of poetry or fiction. This could be subsumed under lecture in respect of the etymology.

**image** Visual image in some form or another. See also *map*.

**artwork** Similar to image, but could also include sculpture and other types of visual art.

- map** Like *image* but specifically for spatial and navigational information about physical locations.
- audio** Speech captured in the form of sounds (rather than transcription) on audio-cassette or other media. See also *music*, *lecture*, *speech*.
- music** Like *audio* but restricted to items that are generally held to be *music*.
- video** Moving pictures, usually also accompanied by sound.
- film** A slight variation of **video**: Moving pictures that were released “on the big screen”.
- software** Computer programs and electronic files whose main purpose is to contribute to the operation of a program, rather than to be read by a human being. *TEX: the Program* (Knuth, 1986) is an example of a computer program published in book form; when such a form exists it could be cited either as a book or as software. Consider what will best serve the reader.
- play** Drama.
- screenplay** A variant of *play*.
- miscellaneous** None of the above, including pamphlets, restaurant menus, patents, grant proposals, court records, business plans, or what have you.
- supplement** Anything added to a parent published item (including supplements, corrigenda, errata, etc.), that appeared separately from the original item.
- fragment** Some part of one of the above types, such as a chapter from a book, an appendix from an article, a page from a World Wide Web document, etc.

Some readers will surely be wondering at this point: “Why the absence of a `url` type? An `incollection` type?” The answer is that it seems better normally to use a type that indicates the intrinsic nature of the writing, rather than the context in which it occurs. An article that appears in a larger collection or on the World Wide Web is still an article and should be cited as such, using the place of publication or `xref` fields to indicate the manner of publication. Consider how silly it would be to cite all kinds of material that might appear on a web page as type `url`: `screenplay`, `map`, `video`??

## 5 Citing a source

The standard `\cite` command of L<sup>A</sup>T<sub>E</sub>X mixes single-cite and multiple-cite functionality in a single command; although most of the time this is convenient, it is something of a departure from the L<sup>A</sup>T<sub>E</sub>X philosophy of logical markup, and gives rise to awkward complications in certain situations. You can write, for example, `\cite{xx,yy}` to get [13, 15] and `\cite[Theorem 4.9]{xx}` to get [13, Theorem 4.9] but there are difficulties in getting [13, Theorem 4.9; 15] or [13; 15, Theorem 4.9].

The `amsrefs` package therefore provides two primary citing commands: `\cite` for single cites and `\citetlist` for multiple cites. Some additional variants of those two commands are provided for convenience.

`\cite{xyz}` works the same as ever, but for the sake of consistency it is recommended that `\cite` be used only for single cites and that multiple cites be handled with `\citelist` (or `\cites`—see below). The square bracket notation `\cite[...]{...}` is also deprecated, because a superior alternative is provided:

```
\cite{xyz}*{Theorem 4.9}
```

Not only is this ordering of the arguments more natural, the star/braces syntax prevents certain scanning problems that afflict the bracketed form—for example, if one wants to put a cite command into the optional argument of a theorem environment:

```
\begin{thm}[\cite[Theorem 4.9]{xyz}]
```

Although the square-bracket syntax continues to be supported for compatibility's sake, users who stick to the `\cite{...}*{...}` form will never be confronted unexpectedly with the puzzling TeX error messages that result from scanning problems as in this example.

`\citelist` takes a list of `\cite` commands as its argument; this makes it possible for any member of the list to be a qualified cite, not just the last one. For example:

```
\citelist{\cite{xx} \cite{yy}*{Theorem 4.9} \cite{zz}}
```

Note that the members of the list *are not separated by commas*. The punctuation between individual cites is supplied automatically (resist the temptation to add it by hand, since that will seldom produce the intended results).

When the cites are numerical, multiple cites are sorted and ranges of length three or more are compressed, as is done by the renowned `cite` package, unless the `amsrefs` option `non-sorted-cites` is used. However, range compression is turned off when the `hyperref` package is used, following its usual practice.

`\cites` is a variant of `\citelist`, provided for convenience:

```
\cites{aa,bb,cc}
```

is equivalent to `\citelist{\cite{aa}\cite{bb}\cite{cc}}`. This can only be used when all the citations are simple ones with no options.

`\ycite` (year only), `\ocite` (object cite), and some related commands are variants of `\cite` that provide the distinctions needed in an author-year citing scheme. See the discussion in Section 6 below.

## 6 Author-year citation schemes

In author-year citation schemes three main citing forms are required to cover the cases that in other schemes require only one form. The first form is used when the citation serves as a parenthetical annotation—i.e., it could be omitted without harming the grammatical structure of the sentence containing it. For example:

The question first arose in systems theory (Rupp and Young, 1977).

The second form is like the first but is used when the author name is already present as a natural part of the sentence, and the cite therefore ought to supply only the year:

Rupp and Young (1977) have investigated . . .

The third form is used when the citation serves as a direct object or other inomissible noun-like object within its sentence. For instance, dropping the citation from the following sentence leaves a grammatically incomplete remainder:

. . . for further details, see Rupp and Young (1977).

The logic of requiring three forms is perhaps most clearly seen if we envision replacing the author-year citations by numerical citations. The type of text replaced by [14] is different in each case:

. . . arose in systems theory [14].

Rupp and Young [14] have investigated . . .

. . . for further details, see [14].

We delegate `\cite` to produce the primary parenthetical form (Author, Year) and provide `\ycite` (“year cite”) and `\ocite` (“object cite”) as the other forms. Plural forms `\ycites` and `\ocites` are also provided in parallel with `\cites`. And `\citeauthor` can be used to produce the list of author names without the year.

These correspond with command names from other commonly used author-year packages as follows:

amsrefs	harvard	natbib
<code>\cite, \cites</code>	<code>\cite</code>	<code>\citep</code>
<code>\ycite, \ycites</code>	<code>\citeyear</code>	<code>\cite</code>
<code>\ocite, \ocites</code>	<code>\citeasnoun</code>	<code>\citet</code>
<code>\citeauthor</code>	(none)	<code>\citeauthor</code>
<code>\citeauthorhy</code>	(none)	<code>\citet</code>

Some people like to use `\citet` or `\citeasnoun` when the author name serves as the subject of a sentence; to my mind this is a questionable blurring of the boundary between the essential text of the sentence and the bibliography pointer. Those who don’t feel a need to bother about such distinctions can write `\citeauthorhy{xyz}` if they choose as an abbreviation for

`\citeauthor{xyz} \ycite{xyz}`

I.e., the command name is `\citeauthor+\ycite` except for dropping the redundant second `cite`.<sup>1</sup>

When an author-year scheme is in use, parens are normally added by `\cite`, `\citetlist` and their variants unless the character immediately following the command’s argument is a closing paren. This suffices for most cases; for special cases one can use the `\parenthesize` command.

<sup>1</sup>Why not simply call it `\aycite`, you may ask? Well, I could hardly pass up the opportunity to get all six vowels in a single command name, could I? (If you really want a shorter command name you can always provide it yourself with `\newcommand`.)

The “full” variants `\fullcite` and `\fullocite` print the full list of author names instead of an abbreviated list, when an (Author, Year) style of citation is in use. For other citation schemes they produce the same output as the normal forms. Some citation styles require the first cite to use the full list and subsequent ones to use the abbreviated version. With proper setup this can be done automatically, so that the “full” variants should seldom be necessary in practice.

### 7 Section titles for bibliographies

The `amsrefs` package provides three environments for producing the section or chapter title of a bibliography:

```
bibchapter
bibsection
bibdiv
```

If you write

```
\begin{bibchapter}
...
\end{bibchapter}
```

it is equivalent to writing

```
\chapter*{\bibname}
...
```

Similarly `bibsection` corresponds to `\section*{\refname}`, whereas `bibdiv` produces one or the other depending on context.

### 8 The `biblist` environment

The `amsrefs` package provides a `biblist` environment which is used for the body of the bibliography. This makes it easier to add introductory text after the section or chapter heading but before the first bib-item. Instead of using `thebibliography`, you would write, for example

```
\begin{bibchapter}[Annotated Bibliography]
(Optional introductory text)
\begin{biblist}
\bib{...}{...}{
...
}
\bib{...}{...}{
...
}
\end{biblist}
\end{bibchapter}
```

The `biblist` environment is based on the standard  $\text{\LaTeX}$  `list` environment and has an optional argument to allow changing the list parameters. To change the amount of space allotted for entry numbers to (e.g.) three digits, use the `\resetbiblist` command:

```
\begin{biblist}[\resetbiblist{000}]
```

The name of the list counter is `bib`. So you could (for example) make the bibliography start at number 0 instead of 1 if you wrote:

```
\begin{biblist}
\setcounter{bib}{-1}
```

## 9 Line breaks in the bibliography

When you need to force a line break between two fields, you can put the `\linebreak` command at the end of the first field. Although this would seem to invite, in most cases, a quite erroneous line break preceding the punctuation that is automatically added, there is special handling behind the scenes to move the line break further along to the right place.

```
title={Bayesian analysis ... econometrics\linebreak},
```

It should be fairly obvious that any change in the bibliography style might invalidate existing forced breaks. “Suggesting” line breaks with, e.g., `\linebreak[3]` is usually a better idea than forcing them.

## 10 Author names

In general  $\text{\LaTeX}$  does quite a good job of dealing with names. But there are a few problem cases. Consider the following examples given in normal and inverted order.

John Q. Smith ↔ Smith, John Q.  
 John Q. Smith, Jr. ↔ Smith, John Q., Jr.  
 John Q. Smith III ↔ Smith, John Q., III  
 John Quincy Smith ↔ Smith, John Quincy  
 Ch. B. Chase ↔ Chase, Ch. B.  
 Rip van Winkle ↔ van Winkle, Rip  
 Thomas W. de la Ware ↔ de la Ware, Thomas W.  
 J. Marshall Ash ↔ Ash, J. Marshall  
 Jakob Ben Isaak ↔ Ben Isaak, Jakob  
 Anna Palamara Orsi ↔ Palamara Orsi, Anna  
 Yin Wuxiang ↔ Yin Wuxiang  
 Wuxiang Yin ↔ Yin, Wuxiang

## 11 Customizing bibliography style

If you use the `amsrefs` package as is, the bibliography style you get is the kind of style customarily seen in AMS publications. The recommended way to get a different bibliography style is to write a  $\text{\LaTeX}$  package which loads the `amsrefs` package with `\RequirePackage` and then makes the desired changes by using suitable `\BibSpec` commands as explained below. Thus, the general form of the custom package will be

```
\ProvidesPackage{xyzbib}[2002/02/28 v1.23]
\RequirePackage{amsrefs}\relax
\BibSpec{article}{
  ...
}
```

```
\BibSpec{book}{
  ...
}
```

The interior formatting within entries is specified by `\BibSpec` commands, one for each entry type. To illustrate, let's look at an example style spec for entries of type `article`:

```
\BibSpec{article}{%
  +{}{\PrintAuthors} {author}
  +{,}{ \textit}      {title}
  +{,}{ }             {journal}
  +{}{\textbf}        {volume}
  +{}{\parenthesize} {date}
  +{,}{ }             {pages}
  +{,}{ }             {note}
  +{.}{ }             {transition}
  +{}{ }              {review}
}
```

It should be pretty obvious that each line specifies the formatting for a particular field. After reading the data for a particular `\bib` command,  $\text{\LaTeX}$  steps through the style spec and for each field listed, prints the field with the given formatting *if and only if the field has a nonempty value*. The `+` character at the beginning of each field spec must be followed by three arguments: the punctuation to be added if the field is nonempty; space and/or other material to be added after the punctuation; and the field name. It is permissible for the second part to end with a command that takes an argument, such as `\textbf`, in which case it will receive the field's value as its argument. By defining a suitable command and using it here you can place material after the field contents as well as before; `\parenthesize` is an example of this.

The reason that the punctuation and the following space are specified separately is that between them there is a crucial boundary for line breaks. If you put a `\linebreak` command at the end of a field value, the break point will actually be carried onward to a suitable point after the next bit of punctuation (whose actual value may vary depending on which of the following fields is the first to turn up with a nonempty value).

The meaning of the `\parenthesize` command, supplied by `amsrefs`, should be obvious. The meaning of the `\PrintAuthors` command is a different story. But I don't think it is all that hard to understand. If we have two or three author names which were given separately, and we need to combine them into a conventional name list using commas and the word "and", then it would be nice if we had a command which could take a list of names and Do The Right Thing. And that is just what `\PrintAuthors` is.

The `rkeyval` package allows keys to be defined as additive: if the key occurs more than once, each successive value will be concatenated to the previous value, along with a prefix. The setup done by `amsrefs` for the `author` field is

```
\DefineAdditiveKey{bib}{author}{\name}
```

This means that if two names are given, as in

```
author={Bertram, A.},
author={Wentworth, R.},
```

then the final value of the `author` field seen when L<sup>A</sup>T<sub>E</sub>X processes the style spec will be

```
\name{Bertram, A.}\name{Wentworth, R.}
```

The `transition` field in our BibSpec example is a dummy field to be used when punctuation or other material must be added at a certain point in the bibliography without regard to the emptiness or non-emptiness of the fields after it. The `transition` field always tests as non-empty but has no printed content. So when you use it you always get the indicated punctuation and space at the indicated point in the list of fields. If it were the last thing in this BibSpec example, it could serve just to put in the final period that is always wanted. But in AMS bibliographies, if a Mathematical Reviews reference is given, it is conventionally printed *after* the final period. Using the `transition` field as shown here ensures that the final period will be always printed, even when the `review` field is empty.

### 11.1 Miscellaneous commands provided by the `amsrefs` package

Most of the following commands are helper commands for use in `\BibSpec` statements. The others are intended for use in bibliography data.

`\parenthesize` This command adds parentheses around its argument. It is useful in `\BibSpec` statements because there is no special provision for adding material after the field value.

`\bibquotes` This command is much like `\parenthesize` but it adds quotes around its argument and it has one other important difference: there are special arrangements to print the closing quote *after* a following comma or similar punctuation (unless the `amsrefs` package is invoked with the `logical-quotes` option, in which case `\bibquotes` puts the closing quote immediately after the quoted material).

`\voltext` The normal definition of this command is `vol.~` to supply the text that precedes a volume number.

`\editiontext` This command produces `ed.` following an edition number. See `\PrintEdition` for more information.

`\DashPages` This command is similar in spirit to `\voltext` but more complicated in its implementation. It takes one argument which is expected to contain one or more page numbers or a range of page numbers. The argument is printed with a prefix of “p.” if it seems to be a single page number, otherwise with a prefix of “pp.”.

`\tsup`, `\tsub`, `\tprime` These are for text subscripts and superscripts, with `\tprime` producing a superscript prime symbol. Unlike the standard



`\textsuperscript` and `\textsubscript` functions provided by L<sup>A</sup>T<sub>E</sub>X, these do not use math mode at all.

<sup>2</sup>

`\nopunct` This command causes following punctuation to be omitted if it is added with the internal function `\@addpunct` (which is used throughout the `\BibSpec` handling when appending a non-empty field).

`\PrintAuthors` This is a relatively complicated function that tests a list of author names in order to decide whether `\sameauthors` or `\AuthorList` should be called.

`\AuthorList` This takes a list of author names in the form

```
\name{Jones, Sam}\name{Smith, John}...
```

and prints them in standard series form with the names uninverted, e.g., “Sam Jones and John Smith”, or “Sam Jones, John Smith, and James Taylor”.

`\sameauthors` This is a function of one argument. If you use the default set of `\BibSpecs` from the `amsrefs`, `\sameauthors` is applied to the author name for a given `\bib` command if it matches exactly the author name of the preceding `\bib` command. Change the definition of `\sameauthors` if you don’t want to get a bysame dash.

`\bysame` This is a horizontal rule of length 3 em. The default definition of `\sameauthors` prints `\bysame` instead of the author names.

`\PrintEditorsA` This is similar to `\AuthorList` but adds (ed.) following the editor name (or (eds.) if applicable).

`\PrintEditorsB` This is like `\PrintEditorsA` but puts parentheses around the entire list of editor names.

`\Plural`, `\SingularPlural` These are helper functions that allow you to conditionally print singular or plural forms such as (ed.) or (eds.) depending on the number of names in the current name list. The definition of `\PrintEditorsA` reads, in part,

```
... (ed\Plural{s}.) ...
```

`\ReviewList` This is similar to `\AuthorList` but is used for printing (possibly multiple) MR numbers given in the `review` field.

`\inicap` This command applies initial capitalization to its argument. The rules used are based on the ones given in the Chicago Manual of Style (see Section 12).

`\EnglishInitialCaps` This command will call `\inicap` if and only if the language of the current reference is English. For this purpose it is “language”

---

<sup>2</sup>There is one drawback: If you don’t want to get the prime symbol for `\tprime` from the `cmsy` font, you will need to redefine `\tprime` in some suitable way.

in the Babel sense that is significant. If English is the default language, you need to specify

```
hyphenation={german},
```

(for example) for non-English references to ensure that nothing will be initial-capped.

**\BibField** This is for more complicated programming tasks such as may be necessary for some BibSpecs. It takes one argument, a field name, and yields the contents of that field for the current `\bib` entry.

**\IfEmptyBibField** If one writes

```
\IfEmptyBibField{isbn}{A}{B}
```

then the commands in A will be executed if the `isbn` field is empty, otherwise the commands in B.

**\PrintEdition** If a bibliography entry has

```
edition={2}
```

and the bib-spec used `\PrintEdition` to handle this field, then the edition information will be printed as “2nd ed.”—that is, the number is converted to cardinal form and “ed.” is added (taken from `\editiontext`).

**\CardinalNumeric** This provides the conversion to cardinal number form used by `\PrintEdition`.

**\PrintDate, \PrintYear** These functions convert a date in canonical form (ISO 8601) to the form required by the current bibliography style. You can get your preferred date form by redefining these functions or by changing your `\BibSpec` statements to use another function of your own devising. The original definition of `\PrintDate` adds parens (as for the year of a journal article in normal AMS style), whereas the `\PrintYear` function simply prints the year without any additional material (as for a book’s year of publication in normal AMS style).

**\mdash, \ndash** These are short forms for `\textemdash` and `\textendash`, recommended instead of the more usual `---` and `--` notation. From the `textcmds` package.

**\cite, \cites, \citelist, \ycite, \ocite, etc.** See the section on **Citations**.

**et cetera ...** [mjd,2002-01-03] See the dtx files for further possibilities that I have not managed to get properly documented yet!

## 12 Capitalization of titles

Here is a summary of the rules given in the *Chicago Manual of Style* [3] for capitalizing titles of written works in English:

Capitalize each word, including pronouns and subordinate conjunctions, except for articles, coordinate conjunctions, and prepositions, or the word *to* in infinitives. Always capitalize the first and last word of the title and the first and last word of any subtitles that it may contain. Don't capitalize the second or later word in a hyphenated compound unless it is a noun or proper adjective, or it has equal force with the first word.

These are the rules followed by the `\EnglishInitialCaps` command; see the documentation of the `inicap` package for more details.

## 13 Implementation

### 13.1 Overview

It will be a while yet before we get to any actual code. First we need to understand what the code needs to accomplish in order to provide the user interface described above in a way that is as compatible as possible with existing  $\LaTeX$  mechanisms.

#### Normal $\LaTeX$ processing of cites

**First  $\LaTeX$  pass** Various commands are written to the aux file that are mostly used by Bib $\TeX$ .

1. A `\cite{moo}` command writes one line to the aux file: `\citation{moo}`. This indicates to Bib $\TeX$  that it should include ‘moo’ in the list of cited items to be searched for. The `\cite` command then checks to see if `\b@moo` is defined: If it is, its contents are printed as the cite ‘number’; if it isn’t,  $\LaTeX$  gives an ‘Undefined citation’ warning and prints question marks instead.
2. A `\bibliographystyle{har}` command writes one line to the aux file: `\bibstyle{har}`. This indicates to Bib $\TeX$  that it should use `har.bst` to determine the style for sorting and formatting the bib items.
3. A `\bibliography{hij,klm,...}` command writes one line to the aux file: `\bibdata{hij,klm,...}`. This indicates to Bib $\TeX$  that it should look in `hij.bib`, `klm.bib`, ... for bibliographic data. The `\bibliography` also tries to input the `.bbl` file, but on the first pass it won’t exist yet.

On the first pass all `\cite`’s normally are reported as undefined because the `.bbl` file has not yet been created.

**Bib $\TeX$  pass** For a document named `xyz.tex`, the command `bibtex xyz` is used to invoke Bib $\TeX$ . It looks in `xyz.aux` to find the citation info written there by  $\LaTeX$ . For each `\citation` line, Bib $\TeX$  searches for a corresponding entry in the specified `.bib` files and formats it. The entire list is then sorted in whatever way dictated by the bibliography style, and written out to the file `xyz.bbl`. This normally produces entries that look something like:

```
\bibitem{BGL} P. Busch, M. Grabowski and P. J. Lahti:
{\it Operational Quantum Physics.}
Springer Verlag, New York (1995).
```

**Second  $\LaTeX$  pass** Now the `.bbl` file exists and contains some `\bibitem` commands. At `\begin{document}`,  $\LaTeX$  reads the aux file, hoping to find some `\bibcite` commands, but it will not find them until the next time around. `\citation`, `\bibstyle`, and `\bibdata` commands in the aux file are simply ignored by  $\LaTeX$ . Then  $\LaTeX$  proceeds to typeset the body of the document.

1. Instances of `\cite` still print question marks.
2. The `\bibliography` command causes  $\LaTeX$  to input `xyz.bbl` and typeset its contents.

3. A `\bibitem{moo}` command writes one line to the aux file: `\bibcite{moo}{9}`, where 9 is the current item number.
4. A `\bibitem[Moody]{moo}` command writes one line to the aux file: `\bibcite{moo}{Moody}`, using the supplied label instead of a number.

**Third L<sup>A</sup>T<sub>E</sub>X pass** Now the aux file contains some `\bibcite` commands. Once again, L<sup>A</sup>T<sub>E</sub>X reads the aux file when it reaches `\begin{document}`.

1. A `\bibcite{moo}{Moody}` causes L<sup>A</sup>T<sub>E</sub>X to define `\b@moo` with ‘Moody’ as the replacement text.
2. If two `\bibcite` commands have the same citation key, L<sup>A</sup>T<sub>E</sub>X gives a warning message. This happens at `\begin{document}`, during the reading of the aux file.
3. Instances of `\cite` in the body of the document will print the appropriate numbers obtained from the aux file.
4. If there are any `\cite` commands for which the aux file did not have a `\bibcite` command, L<sup>A</sup>T<sub>E</sub>X will give an ‘Undefined citation’ warning. This often happens if the aux file is incomplete due to a T<sub>E</sub>X error on the preceding pass.

### 13.2 How cites are processed by `amsrefs`

In order to support its additional features (e.g., author-year citations and the backref option), the `amsrefs` package stores additional information for each cite in the macro `\b@whatever`. Instead of simply using the defined or undefined status of this macro to trigger the standard warnings, we add some boolean flags to allow us to discriminate more finely what the current situation is.

- Each time an item is cited in the body of the document, a backref entry is added to the info of that item. The backref info is the current page and section location. Section location is a bit hard to get right without better support from the documentclass. So we provide a hook to allow it to work better when the support is there.
- When a cite occurs, if the info is undefined then a warning is issued and the info structure is created. A `\citation` command and a `\citedest` command (providing backref info) are written to the aux file. Because the backref info includes page number, it has to be a non-immediate write. An undefined info structure would normally happen only on a first pass when no `.aux` file exists, or when a new cite is added. I.e., when the corresponding `\citation` command is not yet present in the aux file.
- When a citation command occurs in the aux file, it initializes the info structure if necessary, setting the “bib-info-present” flag to 0.
- When a `\citedest` command occurs in the aux file, it initializes the info structure if necessary—but this shouldn’t happen: if the corresponding `\citation` command did not already get processed, then something is wrong. So normally, the `\citedest` command merely needs to add its backref info to the existing info structure.

- When a `\bibcite` command occurs in the aux file, it will normally find that `\b@whatever` is already defined, if the bibliography occurs after all the `\cite` commands. What it must do is fill in the appropriate blank slots in the info structure set up by a previous `\citation` command.
- The aux file is actually processed two times, once at the beginning of the document and once at the end. In the latter case, `\bibcite` should give a warning if the backref-list is empty, since that means there were no `\cite` commands for the given key.
- When processing the bibliography: The `\bib` command needs to check if it is using a key that is already used by another `\bib` command.

We therefore have

```
\b@xyz -> \citesel 00{number}{year}{backref-list}
```

where the first number is 1 if there has already been another citation for the same key earlier in the document (some citation styles use abbreviated forms for all instances after the first), and the second number is 1 if the same key was already used by an earlier `\bib` command.

Because the backref-list often includes page number information, it cannot be built on the fly as we go along; instead we have to write the information to the aux file and read it in at the beginning of the next run.

If there was no `\bibcite` in the aux file for a given key, then the info is

```
\b@xyz -> \citesel 00{}{}{backref-list}
```

If there was neither `\citation` nor `\bibcite` in the aux file for a given key, then the `\cite` command should find that `\b@xyz` is undefined.

If the author-year option is in effect, the “number” contains the author names instead of a number.

```
\b@xyz -> \citesel 00{
    \name{Smith, J. K.}\name{Jones, T. J.}
}{...}{...}
```

Full name information is included in the data because some citation styles give full names at the first citation and abbreviated forms for subsequent instances.

### 13.3 Data structures

The result of scanning the key/value pairs of a `\bib` command is an assignment statement for `\rsk@toks`. (Cf the `rkeyval` package.) For example, consider the entry

```
\bib{miller83}{article}{
  author={Miller, G.},
  title={Eine Bemerkung zur Darstellung von Polynomen \"{u}ber
  Verb\"{a}nden},
  journal={J. Math. Sent.},
  volume={10},
  year={1983},
  pages={26\ndash 30},
}
```

The scanned result is to assign

```
\global\rsk@toks{%
  \@append\name\bib'author{Miller, G.}%
  \DSK@def\bib'title{Eine Bemerkung zur Darstellung von Polynomen
    \"{u}ber Verb\"{a}nden}%
  \DSK@def\bib'journal{J. Math. Sent.}%
  \DSK@def\bib'volume{10}%
  \DSK@def\bib'year{1983}%
  \DSK@def\bib'pages{26\ndash 30}%
}
```

The code in the last arg of `\RestrictedSetKeys` then invokes `\bib@exec` to do something with the value of `\rsk@toks`.

```
\bib@exec{miller83}{\the\rsk@toks}{\setbib@article}{}
```

Now the second-best thing to do with the value, if there weren't any memory limits to worry about, might be to store it directly into `\b@miller83`, reading the bibliography data at the beginning of the document. Then cite commands would have access to every field in the reference, and the bibliography could be printed wherever desired by a suitable dumping command. Since this could potentially use up a rather large chunk of main mem, depending on the size of the bibliography, and since versions of `TEX` without dynamic memory allocation are still in common use, and the fatal error given by `TEX` when it runs out of memory is unlikely in this case to provide much of a clue to the true source of the problem, it seems dangerous to make this behavior the default.

The first, best alternative, however, might be to have cites and bibliography filled in dynamically by the editing software during the writing process, and leave to `LATEX` only some final consistency checks. The Emacs `RefTEX` package is a good example of this sort of thing.

### Associating properties with field values

The data example given above doesn't tell the whole story, because it is in fact sometimes necessary to attach properties to a particular value of a field. The premier example of this is language. The title of a bibliography item, above all, may need to have complicated bits of information supplied about its language: not only whether it is an English or German or Spanish title—which affects hyphenation and capitalization—but for a Russian title (say) which input encoding does it use (since there are several in common use), or whether it is an ASCII transliteration (and if so, what kind), or whether it is a translation into, say, English, of the original title. Arabic and Chinese titles can be equally problematic.

It would be unnatural to plunk this information directly into the contents of the field, but it needs to be tied to the field in some way by our data structures. The simplistic approach would be to use an auxiliary field “extra-foo” for each field foo. But this tends to burn up a lot of `TEX` control sequence names, since the set of field names is quasi-unbounded. So instead I have decided that if a bibliography item has extra data for any of its fields, all such extra data will be stored in another field named “aux”, with embedded tags to indicate which field

each piece of the aux field is associated with. The extra bits can be extracted on demand using standard techniques, and the primary value of each field is not burdened with any attachments, so that comparisons or scanning of the field contents can remain as simple as possible.

Thus in practice there is at least one bit of auxiliary information in every bib item, and our previous example would have the title language indicated:

```
\DSK@def\bib'title{Eine Bemerkung zur Darstellung von Polynomen
  \{"u}ber Verb\{"a}nden}%
\@append\bib'title\bib'aux{\selectlanguage{german}}%
```

That provides a half-way decent T<sub>E</sub>X solution to the problem of storing field properties. The problem of how the user should specify field properties in the bib file is another story.

### 13.4 Preliminaries

```
<*pkg>
```

Standard declaration of package name and date.

```
\NeedsTeXFormat{LaTeX2e}[1995/12/01]
```

Backward handling for beta version. There should be a better way of doing this

```
...
```

```
\@ifpackagewith{amsrefs}{beta}{%
  \expandafter\edef\csname opt@amsrbeta.sty\endcsname
    {\@ptionlist{amsrefs.sty}}%
  \def\@currname{amsrbeta}%
  \expandafter\let\csname amsrbeta.sty-h@k\endcsname\@empty
  \def\@tempa{\input{amsrbeta.sty}\endinput}%
}%
\let\@tempa\@empty
}
\@tempa
\@ifundefined{NormalCatcodes}{%
  \RequirePackage{pcatcode}\relax\PushCatcodes\NormalCatcodes
}{%}
\ProvidesPackage{amsrefs}[2002/02/28 v1.23]
%% WARNING WARNING WARNING: Catcode of apostrophe ' is letter
%% throughout this file.
\catcode'\'=11 % letter
```

### 13.5 Some general tools

Many of these useful functions are found also in AMS documentclasses.

Some short forms to reduce code clutter.

```
\let\@xp=\expandafter
\let\@nx=\noexpand
```

Some frequently used tests for empty arguments.

```
\long\def\@ifempty#1{\@xifempty#1@..\@nil}
\long\def\@xifempty#1#2@#3#4#5\@nil{%
  \ifx#3#4\@xp\@firstoftwo\else\@xp\@secondoftwo\fi}
\long\def\@ifnotempty#1{\@ifempty{#1}{}}
```



A really old version of L<sup>A</sup>T<sub>E</sub>X might still choke on `\newtoks` if it is written directly in the false branch of a conditional.

```
\@ifundefined{@emptytoks}{\csname newtoks\endcsname\@emptytoks}{-}
  Not in the LATEX kernel yet.
\long\def@gobblethree#1#2#3{-}
\long\def@nilgobble#1@nil{-}

\def\macrotext{\expandafter\strip@prefix\meaning}
\def\vdef#1#2{%
  \def#1{#2}\edef#1{\macrotext#1}%
}
```

Test for a trailing option marked by a star. Usage:

```
\newcommand{\blub}[1]{\star@{\blubaux{#1}}{default}}
```

Arg 1 of `\star@` is the code to be run, arg 2 is the default value of the option (could be empty). If arg 1 is `\moo`, this test discards a star and expands to `\moo` if a star is found, or expands to `\moo{#2}` if not. As the example shows, arg 1 need not be a single token.

```
\let\star@char=*
\def\star@#1#2{%
  \def\star@a##1{#1}\def\star@b{#1{#2}}%
  \futurelet\@let@token\star@test
}
\def\star@test{\ifx\@let@token\star@char \let\star@b\star@a\fi \star@b}
```

Please note: If there is a space before the star, then the star is not treated as an option char.

Why use a star? I dunno, it's one of the characters least likely to suffer from catcode changes I guess, since it's already part of standard L<sup>A</sup>T<sub>E</sub>X command syntax.

Why not just put the star at the beginning in the usual way? I dunno, I guess it seemed to me that the lack of a trailing option feature was a deficiency in current L<sup>A</sup>T<sub>E</sub>X and could be given an experimental implementation in a package like this without any adverse effect on existing documents.

```
\def\amsrefs@warning{\PackageWarning{amsrefs}}
```

### 13.6 Package Options

We call the `ifoption` package to facilitate some option tests.

```
\RequirePackage{ifoption}[2000/02/15]
```

Options beginning with `*` require an additional BIB<sub>T</sub>E<sub>X</sub> run in order to take proper effect. We use `*` as the marker because it is one of the few characters that are pretty much guaranteed to be free of catcode changes (because `\@ifstar` relies on it).

The standard `unsrt` biblio style prints the bibliography in citation order, not sorted by author names.

*Need to do an .ltx implementation for citation-order option, and redo the Bib<sub>T</sub>E<sub>X</sub> version too.* [mjd,2002-02-26]

```
\DeclareExclusiveOptions{sorted,citation-order}
```

The `alphabetic` option corresponds to the standard `alpha` biblio style with labels like Knu66 (three letters from name plus two digits of year). Maybe should provide an alias `LlYY` for this option. Numeric is the default since it is commoner in AMS publications.

```
\DeclareExclusiveOptions{alphabetic,author-year,numeric}
```

The standard `abbrv` bibliography style uses abbreviations for month names and journal names, and first names of people are abbreviated to their initials. Since the second test bibliography that I tested with had unabbreviated month names but abbreviated journal names, perhaps it is a good idea to let these choices be specified separately.

```
\DeclareBooleanOption{short-journals}
```

```
\DeclareBooleanOption{short-months}
```

```
\DeclareBooleanOption{initials}
```

In the bibliography, if a title or something is enclosed in quotes, should the closing quotes go inside the punctuation (logical position) rather than outside (traditional)? These options give you a choice.

```
\DeclareExclusiveOptions{traditional-quotes,logical-quotes}
```

A sequence of cites will be sorted and ranges of length three or greater will be compressed if these options so indicate.

```
\DeclareExclusiveOptions{sorted-cites,non-sorted-cites}
```

```
\DeclareExclusiveOptions{non-compressed-cites,compressed-cites}
```

In the bibliography, print page numbers showing where each entry was cited.

```
\DeclareBooleanOption{backrefs}
```

Option for giving information about the available options:

```
\DeclareBooleanOption{?}
```

This option means to forgo loading of the `textcmds` and `mathscinet` packages.

```
\DeclareBooleanOption{lite}
```

This option can be used by later releases as a sign that fall-back adaptations need to be done.

```
\DeclareBooleanOption{beta}
```

This one is obsolete now.

```
\DeclareBooleanOption{jpa}
```

```
\ExecuteOptions{numeric,sorted,traditional-quotes,%
                sorted-cites,compressed-cites}
```

```
\ProcessOptions\relax
```

```
\ProcessExclusiveOptions
```

Note that in the following auxiliary package list, “getwidth” is not (yet) included.

```
\IfOption{?}{%
```

```
\begingroup\catcode'\%=9 \catcode'\#=14 \catcode'\ =12
```

```

\let\@backslashchar \catcode\endlinechar=12 \endlinechar='^^J
}{%#
  \typeout{Try \string\usepackage[?]{amsrefs} to get more information %#
          about amsrefs.}%#
}%#
%%\typeout{^^J#
%%The amsrefs package makes use of the following subordinate packages:
%%
%% pcatcode      textcmds
%% ifoption      mathscinet
%% rkeyval
%% inicap
%%
%%Package options for amsrefs are:
%%
%% ?             Show this information
%%
%% numeric       Numbered citations, standard AMS journal style
%% alphabetic    Alphabetic citations, standard AMS journal style
%% author-year   Author-year citation style
%%
%% short-journals "Duke Math. J." instead of "Duke Mathematical Journal"
%% short-months  "Jan." instead of "January"
%% initials      "Smith, J. Q." instead of "Smith, John Quincy"
%%
%% traditional-quotes \bibquotes quotes text ‘‘like this,’’
%% logical-quotes    \bibquotes quotes text ‘‘like this’’,
%%
%% sorted-cites      [9,1,16,4] --> [1,4,9,16] (numeric cites only)
%% non-sorted-cites No sorting of numeric cites
%%
%% compressed-cites [1,2,3,4] --> [1-4] (numeric cites only)
%% non-compressed-cites No range compression of numeric cites
%%
%% backrefs         Backward references from bibliography entries
%%                  to citations
%%
%%Defaults are: numeric, traditional-quotes, sorted-cites, and
%%compressed-cites.
%}\aftergroup\@gobble\endgroup

```

### 13.7 Auxiliary packages

Now, if these other packages make use of the `pcatcode` package like they should, then we don't need to make any fuss here about the special catcode of `'`. Just load the packages.

```

\RequirePackage{rkeyval}[2001/12/22]
\RequirePackage{inicap}[2002/01/01]
\IfOption{lite}{% True? Then don't load the next two packages.
}{%
  False? OK, let's load them:
  \RequirePackage{textcmds}[2001/12/14]

```

```
\RequirePackage{mathscinet}[2002/01/01]
}
```

### 13.8 The biblist environment

The `biblist` environment can be used with a section or chapter heading.

`biblist` Arg 1 was intended for key-value options, but support for that is not done yet, instead it is just handled as additional list setup code. [mjd,2000/03/07]

```
\newenvironment{biblist}[1] []{%
  \normalfont \footnotesize \labelsep .5em\relax
  \list{\BibLabel}{%
    \resetbiblist{00}%
    \usecounter{bib}%
    #1\relax
  }%
  \sloppy
```

Discourage page breaks within bibliography entries and disable them completely for entries that are less than four lines long.

```
\interlinepenalty\@m \clubpenalty\@M \widowpenalty\clubpenalty
\frenchspacing
\ResetCapSFCodes
\let\@bibdef\normal@bibdef
}{%
```

Change error for empty list (no items) to warning, to allow authors to leave their bibliography temporarily empty during writing:

```
\def\@noitemerr{\@latex@warning{Empty bibliography list}}%
\endlist
}
```

In case this is undefined sometimes.

```
\def\CurrentBib{??}
\newcommand{\BibLabel}{%
  [\hyper@anchorstart{cite.\CurrentBib}\relax\thebib\hyper@anchorend]%
}
\newcommand{\resetbiblist}[1]{%
  \settowidth\labelwidth{\def\thebib{#1}\BibLabel}%
  \leftmargin\labelwidth
  \ifdim\labelwidth=\z@
    \leftmargin=1em \itemindent=-\leftmargin
  \else
    \advance\leftmargin\labelsep
  \fi
}
```

### 13.9 Printing a bibliography entry

These two things (`\bib@start` and `\bib@end`) used to be useful, but I haven't entirely made up my mind to get rid of them yet. [mjd,2001-11-28]

```
\def\bib@start{\begingroup}
```

Instead of being handled by `\bib@end`, ending punctuation is normally handled via the ‘transition’ field `qv`.

```
\def\bib@end{\relax
  \@xp\PrintBackRefs\@xp{\CurrentBib}%
  \par\endgroup
}
```

For list macros such as `\name`, we want them to be unexpandable except when special processing is done.

```
\let\name=?
\let\isbn=?
\let\review=?

\newcommand{\partialbib}[1]{%
  \begingroup
  \RestrictedSetKeys{\let\rsk@nocomma\amsrefs@nocomma}{bib}%
  {\bib@partial}{\the\rsk@toks}{\endgroup}{#1}%
}
```

And here are the predefined key names. You could always add some more if you needed them. Only worry is about compatibility if you want to share your data with other people.

```
\let\bib@reset\@empty % this gets modified by the following statements.
```

First the fields that could be repeated more than once in a single entry. Maybe publisher should be allowed to repeat also, for co-published works. But then need to worry about the address handling.

```
\DefineAdditiveKey{bib}{author}{\name}
\DefineAdditiveKey{bib}{editor}{\name}
\DefineAdditiveKey{bib}{isbn}{\isbn}
\DefineAdditiveKey{bib}{review}{\review}
\DefineAdditiveKey{bib}{part}{\partialbib}

\DefineSimpleKey{bib}{title}
\DefineSimpleKey{bib}{subtitle}
\DefineSimpleKey{bib}{booktitle}
\DefineSimpleKey{bib}{series}
\DefineSimpleKey{bib}{conference}
\DefineSimpleKey{bib}{publisher}
\DefineSimpleKey{bib}{organization}
\DefineSimpleKey{bib}{institution}
\DefineSimpleKey{bib}{address}
\DefineSimpleKey{bib}{place}
\DefineSimpleKey{bib}{year}
\DefineSimpleKey{bib}{date}
\DefineSimpleKey{bib}{journal}
\DefineSimpleKey{bib}{fulljournal}
\DefineSimpleKey{bib}{issn}
\DefineSimpleKey{bib}{volume}
\DefineSimpleKey{bib}{number}
\DefineSimpleKey{bib}{pages}
```

```

\DefineSimpleKey{bib}{doi}
\DefineSimpleKey{bib}{status}
\DefineSimpleKey{bib}{eprint}
\DefineSimpleKey{bib}{preprint}
\DefineSimpleKey{bib}{language}
\DefineSimpleKey{bib}{hyphenation}
\DefineSimpleKey{bib}{note}
\DefineSimpleKey{bib}{url}
\DefineSimpleKey{bib}{xref}
\DefineSimpleKey{bib}{label}
\DefineSimpleKey{bib}{type}
\DefineSimpleKey{bib}{edition}
\DefineSimpleKey{bib}{setup}
\DefineSimpleKey{bib}{name}

```

The `transition` key is used when we want to insert punctuation or other material at a given point in the sequence, even if all following fields happen to be empty. The key appears to have a non-empty value but its value is effectively empty.

```

\DefineDummyKey{bib}{transition}
This provides access for BibSpec functions to individual fields.
\newcommand{\BibField}[1]{\csname bib'#1\endcsname}
\newcommand{\IfEmptyBibField}{\rkvIfEmpty{bib}}

```

Here is the sequence of macro calls when `\bib` runs in a normal way to print a bib item.

```

\bib{abk89}{proceedings.article}{...}
  \bib -> \@ifstar and call \BibItem

\BibItem{abk89}{proceedings.article}{...}
  \BibItem #1#2-> read key, type and call \@bibdef
#1<-abk89
#2<-proceedings.article

\@bibdef \setbib@proceedings.article {proceedings.article}{abk89}
  \@bibdef #1#2#3-> warn if #1 is undefined; call RestrictedSetKeys
#1<-\setbib@proceedings.article
#2<-proceedings.article
#3<-abk89

\RestrictedSetKeys {...}{bib}{\bib@exec ...}{...}
  Read three args and then futurelet to start key scanning.
  Third arg is code to call after scanning is finished.
  \RestrictedSetKeys [#1]#2#3-> ... (futurelet to start key scanning)
#1<-\amsrefs@nocomma
#2<-bib
#3<-\bib@exec {abk89}{\the \rsk@toks }{\setbib@proceedings.article }\endgroup
\rsk@finish ->\bib@exec {abk89}{\the \rsk@toks }{...

```

```

\bib@exec #1#2#3->
#1<-abk89
#2<-\the \rsk@toks
#3<-\setbib@proceedings.article

```

Here `\bib@exec = bib@print`: Start up a group, process the assignments found in `\rsk@toks`, run `\bib@cite{KEY}`, then run `\setbib@moo`

Here is where the rubber hits the road.

```

\newcommand{\bib}{%
  \begingroup
  \@ifstar{\let\bib@exec\bib@store
    \let\@bibdef\normal@bibdef
    \BibItem}%
    {\BibItem}%
}

%% #1 key #2 type
\newcommand{\BibItem}[2]{%
  \def\@tempa{#1}%
  \edef\@tempb{%
    \@nx\@bibdef\@xp\@nx\csname setbib@#2\endcsname{#2}%
    {\macrotext\@tempa}%
  }%
  \@tempb
}
\let\biblio@list\@empty

```

Use a standard L<sup>A</sup>T<sub>E</sub>X counter for numbering biblio items.

```
\newcounter{bib}
```

The standard `\NoCommaWarning` is not entirely apt here, so we make a slightly different version.

```

\def\amsrefs@nocomma{\amsrefs@warning{%
  Missing comma: some text might print incorrectly\MessageBreakNS}}

%% #1 \setbib@article #2 article #3 key
\def\normal@bibdef#1#2#3{%
  \ifx\relax#1%
    \PackageError{amsrefs}{Undefined entry type: #2}\@ehc
    \let#1\setbib@misc
  \fi
  \RestrictedSetKeys{\let\rsk@nocomma\amsrefs@nocomma}{bib}%
  {\bib@exec{#3}{\the\rsk@toks}{#1}\endgroup}%
}

\let\@bibdef\normal@bibdef

```

This is a variation that ignores anything not having a known citation key.

```

%% #1 \setbib@article #2 article #3 key
\def\selective@bibdef#1#2#3{%
  \@xp\selbibdef@a\csname b@#3\endcsname{#1}{#2}{#3}%
}

```

```

}
\def\selbibdef@a#1{%
  \def\@tempa{\endgroup\@gobblefour}%
  \ifx\relax#1\else \xp\selbibdef@b#1\@nil \fi
  \@tempa
}
\def\selbibdef@b#1#2#3\@nil{%
  \ifx #2\let\@tempa\copy@bibdef\fi
}
\def\copy@bibdef#1#2#3{%
  \ifx\relax#1%
    \PackageError{amsrefs}{Undefined entry type: #2}\@ehc
    \let#1\setbib@misc
  \fi
  \@open@bbl@file
  \bbl@write{\string\bib{#3}{#2}\string{\iffalse}\fi}%
  % empty arg means use current value of \rsk@set instead of overriding it.
  \RestrictedSetKeys{\let\rsk@nocomma\amsrefs@nocomma
    \global\let\rsk@set\bbl@copy}{}%
    {\bbl@write{\iffalse{\fi\string}}}%
    \endgroup}%
}
\def\bbl@copy#1\endcsname#2{%
  \toks@{#2}%
  \bbl@write{ \space#1={\the\toks@},}%
  \rsk@resume
}

```

The function `\EnglishInitialCaps` needs to verify that the language is English before applying capitalization.

```

\providecommand{\languagename}{english}
\def\biblanguagelEnglish{english}
\let\biblanguagedefault\biblanguagelEnglish
\let\bib@language\@empty

\def\@ifsame@patterns#1#2{%
  \xp\@ifsamepat\csname l@#1\@xp\endcsname\csname l@#2\endcsname
}
\def\@ifsamepat#1#2{%
  \ifnum
    \ifx\relax#1\m@ne\else#1\fi
    =\ifx\relax#2\m@ne\else#2\fi
    \xp\@firstoftwo
  \else
    \xp\@secondoftwo
  \fi
}
\def\bib@language@fixup{%
  \ifx\bib'hyphenation\@empty
    \ifx\bib'language\@empty \let\bib@language\biblanguagedefault

```



```

    \else \let\bib@language\bib'language
    \fi
  \else
    \let\bib@language\bib'hyphenation
    \fi
  \def\@tempa##1 ##2\@nil{\lowercase{\def\bib@language{##1}}}%
  \@firstofone{\@xp\@tempa\bib@language} \@nil
}

```

For `\bib` purposes we are interested mainly in testing whether the hyphenation patterns are the same. So we use an if-same-patterns test (by which `babel`'s 'english' and 'american' compare as equal) rather than an if-same-language test. Also, the way that the `\selectlanguage` command checks to see whether a language has been properly defined for `babel` use is to see if `\dateLANGUAGE` is defined. And if we tried to select an undefined language, the result would be a  $\LaTeX$  error.

```

\def\bib@selectlanguage{%
  \@ifsame@patterns{\language\name}{\bib@language}{-}{-}%
  \@ifundefined{date\bib@language}{-}{-}%
  \@xp\selectlanguage\@xp{\bib@language}%
  }%
}

```

```

\def\bib@field@patches{%
  \let\bib@author\bib'author
  \let\bib@editor\bib'editor
  \let\bib@date\bib'date
  \ifx\bib@date\@empty \let\bib@date\bib'year \fi
  \bib@parsedate
  \ifx\bib'date\@empty \ifx\bib'year\@empty
    \let\bib@date\bib'status
    \let\bib@year\bib@date
  \fi\fi
}

```

`\bib'language` is used for producing the printed rendition of the language. `\bib@language` needs to be in the form required by `\selectlanguage`.

```

  \bib@language@fixup
  \ifx\bib'place\@empty \let\bib'place\bib'address\fi
}

\def\bib@bibcite#1#2#3{%
  \begingroup
  \let\bib@elt\relax
  \xdef\biblio@list{\biblio@list\bib@elt{#1}}%
  \endgroup
  \if\numeric@refs
    \stepcounter{bib}%
    \protected@edef\@currentlabel{\@nx\@nx\@nx\cite@x{\thebib}{}}%
  \else
    \bib@reset
  \fi
}

```

```

\edef\bib@@data{#2}%
\bib@@data % execute definitions locally
% \bib@resolve@xrefs % ??
\bib@field@patches
\def\@currentlabel{\@nx\cite{x{\bib@year}{\bib@author}}}%
\let\name\relax
\fi
\protected@edef\@tempa{\@nx\bibcite{#1}{\@currentlabel}}%
\@tempa
}
\let\bib@@data\@empty
\let\all@bibs\@empty
% #1 key #2 \the\rsk@toks #3 \setbib@article
\def\bib@store#1#2#3{%
\begingroup
\bib@reset
\edef\bib@@data{#2}%
\bib@@data % execute definitions locally
% \bib@resolve@xrefs % ??
\bib@field@patches
\def\@currentlabel{\@nx\cite{x{\bib@year}{\bib@author}}}%
\global\@xp\let\csname bi@#1\endcsname\bib@@data
\@xp@g@addto@macro\@xp\all@bibs\csname bi@#1\endcsname
\endgroup
}

```

If one of the names in a name list is discovered to be an abbreviation, resolve it. I guess this requires rebuilding the list.

```

% \xref@check@a\bib'author
% --> \name{Smith, J. K.}\name{me.w.e}
\def\xref@check@a#1{%
\ifx\@empty#1\relax
\else
\begingroup
\toks@\@emptytoks
\let\name\xref@check@aa
#1\relax
\edef\@tempa{\endgroup \def\@nx#1{\the\toks@}}%
\@tempa
\fi
}
\def\BibAbbrevWarning#1{\amsrefs@warning{Abbreviation '#1' undefined}}
\def\xref@check@aa#1{\def\@tempa{#1}\lowercase{\def\@tempb{#1}}%
\ifx\@tempa\@tempb
\ifx\@tempa\@empty
\toks@\@xp{\the\toks@ \name{}}%
\else
\@ifundefined{bi@#1}{%
\BibAbbrevWarning{#1}%
}
}

```

I think the extra space and unskip helps to avoid a certain kind of error. [mjd,2001-12-27]

```

    \toks@\xp{\the\toks@ \name{#1 \unskip}}%
  }{%
    \xref@check@ab{#1}%
  }%
  \fi
\else
  \toks@\xp{\the\toks@ \name{#1}}%
\fi
}
\def\xref@check@ab#1{%
  \let\bib'name\@empty
  \csname bi@#1\endcsname
  \ifx\@empty\bib'name
    \@temptokena{#1}%
  \else
    \@temptokena\xp{\bib'name}%
  \fi
  \edef\@tempa{\toks@\{ \the\toks@\@nx\name{\the\@temptokena}\}}%
  \@tempa
}
\def\xref@check@b#1{%
  \ifx\@empty#1%
  \else
    \toks@\xp{#1}%
    \edef\@tempb{\lowercase{\def\@nx\@tempa{\the\toks@}}}%
    \@tempb
    \ifx\@tempa#1\relax % all lowercase
      \let#1\@empty
      \csname bi@\the\toks@\endcsname
    \fi
  \fi
}
\def\XRefWarning#1{\amsrefs@warning{Xref '#1' undefined}}

```

If any title occurs in an xref-d item, assume that it is a book title. This might not always be the best assumption? Let's see how it goes though. [mjd,2001-12-11]

```

\def\xref@add@toks#1#2{%
  \ifx#1\@empty
    \toks@\xp{\the\toks@\DSK@def#1{#2}}%
  \else
    \def\@tempa##1\bib'title##2##3\@nil{##2}%
    \if T\@tempa #1T\bib'title F\@nil
      \toks@\xp{\the\toks@\DSK@def\bib'booktitle{#2}}%
    \fi
  \fi
}

```

```

\def\xref@check#c#1{%
  \begingroup
  \let\DSK@def\xref@add@toks
  \toks@ \@emptytoks
  \@for\xref@ID=#1\do{%
    \@ifundefined{bi@\xref@ID}{%
      \XRefWarning{\xref@ID}%
    }{%
      \csname bi@\xref@ID\endcsname
    }%
  }%
  \edef\@tempa{\endgroup\the\toks@}%
  \@tempa
}

\def\bib@resolve@xrefs{%
  \ifx\bib'xref@\@empty \else \xref@check#c\bib'xref \fi
  \xref@check@a\bib'author \xref@check@a\bib'editor
  \xref@check@b\bib'journal \xref@check@b\bib'publisher
}

\def\bib@print#1#2#3{%
%% #1 citation key, #2 \the\rsk@toks, #3 \setbib@moo
  \bib@start
  \bib@reset
  \let\setbib@@#3%
  \edef\bib@@data{#2}%
  \bib@@data % execute definitions locally
  \bib@resolve@xrefs % modifies \bib@@data
  \bib@field@patches
  \bib@selectlanguage
  \bib'setup
  \bib@cite{#1}\kern\@ne sp\relax
  \ifx\setbib@@\setbib@article
    \ifx\bib'booktitle\@empty
      \else \let\setbib@@\setbib@incollection
    \fi
  \fi
  \setbib@@
  \bib@end
}

\def\bib@partial#1#2#3{%
%% #1 citation key, #2 \the\rsk@toks, #3 \setbib@moo
  \begingroup
  \bib@reset \let\bib'title\@empty \let\bib'author\@empty
  \edef\bib@@data{#2}%
  \bib@@data % execute definitions locally
  \bib@field@patches
  \bib'setup
  \setbib@@
  \endgroup
}

```

```

}
  This is just an alias for convenience.
\let\bib@exec\bib@bibcite
\AtBeginDocument{\let\bib@exec\bib@print}
  When \bib@cite is called, author name and year are available in \bib@author
and \bib@year.
\IfOption{author-year}{%
  \def\cite@label{%
    \ifx\bib@author\@empty \bib@editor \else \bib@author \fi
  }%
}%
\def\cite@label{\@currentlabel}%
}

\IfOption{alphabetic}{%
  \def\alpha@label{%
    \ifx\@empty\bib'label
      \def\thebib{\CurrentBib}%
    \else
      \let\thebib\bib'label
    \fi
  }%
}%
\let\alpha@label\relax
}

\def\bib@cite#1{%
  \alpha@label % modify \thebib if necessary
  \def\CurrentBib{#1}%
  \item\leavevmode
  \@xp\bib@cite@a\csname b@#1\endcsname
  \bibcite@write{#1}%
}

\def\bib@cite@a#1{%
  \ifx\relax#1%
    \protected@edef\@tempa{%
      \gdef\@nx#1{\@nx\citesel 01{\cite@label}{\bib@year}{}}}%
    \@tempa
  \else
    \@xp\bib@cite@check\@xp#1#1%
    \@empty\@empty\@empty\@empty\@empty
  \fi
}

```

For the citation key we want to check if it is already defined. But there is a slight problem. There is already one control sequence in use for each bibliography entry, to store the number or the author/year information needed by `\cite`. If we introduce another control sequence to check whether a particular cite is multiply defined, then we double the number of control sequences used.

For a large bibliography in a book this is fairly serious. This is addressed by using a `\citesel` function.

```
% #1      #2      #3#4 #5      #6      #7
% \b@foo -> \citesel ??{number}{year}{backrefs}
\def\bib@cite@check#1#2#3#4#5#6#7{%
  \ifx 1#4\relax
    \DuplicateBibKeyWarning
  \else
    \protected@edef\@tempa{%
      \gdef\@nx#1{\@nx\citesel #31{\cite@label}%
        {\bib@year\ifx\citesel\citesel@authoryear \bib'label\fi}%
        {#7}}}%
    \@tempa
  \fi
}

\def\DuplicateBibKeyWarning{%
  \amsrefs@warning{%
    Duplicate \protect\bib\space key%
    '\CurrentBib ' detected\MessageBreakNS}%
}

\def\bibcite@write#1{%
  \if@filesw
    \let\citesel\citesel@write
    \csname b@#1\endcsname
  \fi
}

\def\citesel@write#1#2#3#4#5{%
  \begingroup
  \toks@{\#3}{#4}%
  \immediate\write\@auxout{\string\amsRefs}%
  \immediate\write\@auxout{\string\bibcite{\CurrentBib}{\the\toks@}}%
  \endgroup
}
```

Because duplicate bibs are caught immediately, we don't need `\bibcite` to run `\@testdef`.

```
\AtEndDocument{\let\amsRefs@bibcite@gobbletwo}
```

### 13.10 Some abbreviations

The commands `\DefineName`, `\DefinePublisher`, and `\DefineJournal` are provided to make abbreviations a little easier.

```
\newcommand{\DefineName}[2]{%
  \begingroup
  \let\bib@exec\bib@store \BibItem{#1}{person}{name={#2},}%
}

\newcommand{\DefineJournal}[2]{%
  \begingroup
  \let\bib@exec\bib@store \BibItem{#1}{periodical}{journal={#2},}%
}
```

```

}
\newcommand{\DefinePublisher}[3]{%
  \begingroup
  \let\bib@exec\bib@store
  \BibItem{#1}{publisher}{%
    publisher={#2},%
    place={#3},
  }%
}

```

This is what the standard `book.cls` has for the bibliography title:

```

\newenvironment{thebibliography}[1]
  {\chapter*{\bibname
    \mkboth{\MakeUppercase\bibname}{\MakeUppercase\bibname}}%
    \list{\@biblabel{\@arabic\c@enumiv}}%
  \newcommand{\printbibliography}[1][\bibname]{%
    \begin{bibdiv}[#1]%
    \begin{biblist}%
    \let\bib@elt\bib@print
    \biblio@list
    \end{biblist}%
    \end{bibdiv}%
  }
  \renewenvironment{thebibliography}[1]{%
    \bibdiv
    \biblist[\resetbiblist{#1}]%
  }{%
    \endbiblist
    \endbibdiv
  }
  \providecommand{\bibname}{Bibliography}
  \providecommand{\refname}{References}

```

We need to take a little extra trouble here to pre-expand the `\bibname`.

```

\newenvironment{bibchapter}[1][\bibname]{%
  \begingroup
  \LoadBackRefs
  \protected@edef\@{\endgroup\protect\chapter*{#1}}%
  \@
}{\par}
\newenvironment{bibsection}[1][\refname]{
  \begingroup
  \LoadBackRefs
  \protected@edef\@{\endgroup\protect\section*{#1}}%
  \@
}{\par}%
\@ifundefined{chapter}{%
  \newenvironment{bibdiv}{\bibsection}{\endbibsection}
}{%

```

```

\newenvironment{bibdiv}{\bibchapter}{\endbibchapter}
}

```

An extremely crude way of carrying forward the current font series (basically, bold or non-bold) for the next punctuation object. This needs work I guess. [mjd,2001-12-11] As things currently stand, when you specify a font in the punctuation argument of a bibspec line, it interferes with the stuff in `\SwapBreak` that prevents redundant punctuation.

```

\let\bib@lastseries\@empty
\def\CarryFontSeries{\global\let\bib@lastseries\f@series}
\def\SameFontSeries#1{%
\begingroup
\ifx\bib@lastseries\@empty
\else \fontseries\bib@lastseries\selectfont
\global\let\bib@lastseries\@empty
\fi
#1\endgroup
}

```

The arg has to start with a simple punctuation character in order for this to work as intended.

```

\def\SwapBreak#1{%
\@tempcnta\@MM
\ifhmode
\unskip
\ifnum\lastpenalty=\z@
\else \@tempcnta\lastpenalty \unpenalty
\fi
\fi
}

```

Omit arg 1 (punctuation) if there is a special kern or spacefactor to so indicate.

```

\toks@{\SameFontSeries{#1}}%
\edef\tempa{%
\@nx\deferredquoteslogical
\ifnum\lastkern=\@ne
\else

```

If the preceding text ended with an abbreviation, we don't want to redundantly add another period. Check the spacefactor.

```

\ifnum\spacefactor=\sfcode\@xp\@xp\@xp'\@xp\@car\string#1)\@nil
\else \the\toks@
\fi
\fi
\@nx\deferredquotes
\ifnum\@tempcnta=\@MM \else \penalty\number\@tempcnta\space\fi
\ifnum\lastkern=\@ne \ignorespaces \fi
}%
\tempa
}
\newcount\series@index

```



The `\PrintSeries` command prints a list of objects in series form. The essential idea is to produce something like “A, B, and C” when we are given three elements A B C, with suitable variations in the punctuation and other intervening material if the number of elements is less or more than three.

To generalize this process, we envision `\PrintSeries` being called as

```
\PrintSeries{i0}{i1}{i2}{i3}{i4}{\do{A}\do{B}...}
```

where  $i_0, \dots, i_4$  are material to be interpolated and the last arg is a list of indeterminate length where each element consists of a macro and its argument. The output, depending on the number of elements, will be

```
i0 A i4                % 1 element
i0 A i1 B i4           % 2 elements
i0 A i2 B i3 C i4     % 3 elements
i0 A i2 B i2 C i2 ... X i2 Y i3 Z i4 % 26 elements
```

That is the simple explanation but in practice there are some additional complications. What if user-supplied line breaks have to be supported at the boundaries between elements? What if in addition to adding material between elements we also want to apply some handy function to each element (e.g., `\textsc`)? Even worse, what if we want the function to be different depending on the position of the element in the list?? Indeed if this did not happen to be the case with the current application I would not have gone to the extra trouble of supporting it. But if it must be so, then the output that we need from a list `\do{A}\do{B}...` is

```
f0{A}
f0{A} p1 i1 f1{B}
f0{A} p2 i2 f2{B} p3 i3 f3{B}
```

and so on, where

- $f_n$  is a macro taking one argument,
- $p_n$  is punctuation—material that must precede a line break if one occurs at this boundary,
- $i_n$  other interpolated material, as before.

To reduce the number of distinct required objects we decree that each element will get braces wrapped around it as a matter of course; then it is possible for  $f_1, f_2, f_3$  to be assimilated into the tail end of  $i_1, i_2, i_3$ .

```
\def\PrintSeries#1#2#3#4#5#6#7#8{%
  \begingroup
  \def\series@add@a{#2}%
  \def\series@add@b{\SwapBreak{#3}#4}%
  \def\series@add@c{\SwapBreak{#5}#6}%
  \def\series@add@d{\SwapBreak{#7}#8}%
  \PrintSeries@a{#1}%
}
```

`\Plural` takes one argument and prints it if there were two or more elements in the current list. So, to get “editors” instead of “editor” after printing a list of editor names, write `editor\Plural{s}`.

`\SingularPlural` takes two arguments and prints the first if there was only one element, otherwise prints the second arg.

```
\newcommand{\SingularPlural}[2]{#1}
\newcommand{\Plural}{\SingularPlural{}}
```

For `\PrintSeries@a` the first arg is the iterator function present in the list which is arg 3. Args 2 and 4 are extra material to be added before and after the list that may require the use of `\Plural` or `\SingularPlural`.

```
\def\PrintSeries@a#1#2#3#4{%
  \series@index\z@ \def#1{\advance\series@index\@ne \@gobble}%
  #3\relax
  \ifnum\series@index=\@ne \let\SingularPlural\@firstoftwo
  \else \let\SingularPlural\@secondoftwo
  \fi
  \chardef\series@total=\series@index \series@index=\z@
  \let#1\series@add
  #2#3#4\relax
  \endgroup
}
```

This is the inner function called by `\PrintSeries` that carefully distributes all the material stored previously in `\series@add@...` macros.

```
\def\series@add#1{%
  \advance\series@index\@ne
  \let\@tempa\relax
  \ifcase\series@index
  \or % material before name 1
    \let\@tempa\series@add@a
  \or % material before name 2
    \ifnum\series@total<\thr@@ \let\@tempa\series@add@b
    \else \let\@tempa\series@add@c
    \fi
  \else % material before name 3, 4, 5, ...
    \ifnum\series@index<\series@total \let\@tempa\series@add@c
    \else \let\@tempa\series@add@d
    \fi
  \fi
  \@tempa{#1}%
}
```

The function `\bib@append` prints the value of a field, together with associated punctuation and font changes, unless the value is empty. Arg 1 is punctuation (that may need to be swapped with a preceding line break), arg 2 gives the space to be added after the punctuation, and possibly a function to be applied to the contents of arg 3, which is a macro containing the field value. So if we have `\moo` and `\bib'pages`, from `pages={21\ndash 44}`, then we want to arrange to call

```
\moo{21\ndash 44}
```

We don't want to simply call `\moo\bib'bar` because that makes it rather difficult for `\moo` to look at the contents of `\bib@bar`.

```

\def\bib@append#1#2#3{%
  \ifx\@empty#3\relax
  \else
    \ifx\relax#3\errmessage{#3=\relax}\fi
    \ifempty{#1}{%
      \@temptokena{\ifnum\lastkern=\@ne\ignorespaces\fi #2}%
    }{%
      \@temptokena{\SwapBreak{#1}#2}%
    }%
    \toks@\@xp{#3}%
    \edef\@tempa{\the\@temptokena{\the\toks@}}%
    \xp\@tempa
  \fi
}

\let\endbracket\@empty
\let\bracket@stack\@empty
\def\push@bracket#1{%
  \xdef\bracket@stack{#1\bracket@stack}%
}
\def\pop@bracket{\iffalse\fi
  \@xp\pop@bracket@a\bracket@stack \@empty}}
\def\pop@bracket@a#1{\leavevmode\@xp{#1}\xdef\bracket@stack{\iffalse}\fi}

```

The `\parenthesize` function adds parens around its argument, calling `\upn` to prevent italic parens from being used. But the default definition of `\upn` is a no-op, meaning that this refinement lies dormant unless the `upref` package or other activation is done. (Probably better done via special fonts, anyway.)

```

\providecommand{\upn}[1]{#1}
\newcommand{\parenthesize}[1]{%
  \leavevmode\push@bracket)\upn{(#1)\pop@bracket
}

\let\deferredquotes\@empty
\IfOption{logical-quotes}{%
  \def\deferredquoteslogical{\deferredquotes}%
}{%
  \let\deferredquoteslogical\relax
}

\newcommand{\bibquotes}[1]{%
  \textquotedblleft#1%
  \gdef\deferredquotes{%
    \global\let\deferredquotes\@empty \textquotedblright
  }%
}

\providecommand{\mdash}{\textendash}
\providecommand{\ndash}{\textendash}

```

For older versions of some AMS documentclasses, this patch is needed.

```

\providecommand{\MRhref}[1]{

```

The `\@addpunct` function is defined by AMS documentclasses and the `amsgen` package. But if we find it undefined we had better define it.

```
\ifundefined{@addpunct}{%
  \def\@addpunct#1{%
    \relax\ifhmode\unskip\ifnum\spacefactor>\@m \else#1\fi\fi
  }
  \def\frenchspacing{\sfcode'\.1007\sfcode'\?1006\sfcode'\!1005%
    \sfcode'\:1003\sfcode'\;1002\sfcode'\,1001\relax}
}{%}
\providecommand{\nopunct}{\spacefactor 1004\relax}
\providecommand{\ResetCapSFCodes}{%
  \count@=\A
  \def\@tempa{\sfcode\count@=\@m
    \advance\count@\@ne
    \ifnum\count@>\Z\relax\expandafter\@gobble \fi
    \@tempa
  }%
  \@tempa
}
```

The `\bibspectoscan` function scans one field spec from the second arg of `\BibSpec`. Each field spec has the form

```
+{punctuation}{prelim material}{field name}
```

We provide a certain amount of error recovery by reading an extra argument and checking if it is a plus sign as expected. If the plus sign is missing for the next field, we skip arg 4 (printing the tail of it if it is multiple tokens), give an error message, and strive to continue anyway. This might produce hilarious nonsense—but that could be, after all, not such a bad thing once in a while.

```
\def\bibspectoscan#1#2#3#4{%
  \toks@\exp{\the\toks@\bibappend{#1}{#2}}%
  \edef\@tempa{%
    \toks@{\the\toks@ \exp\@nx\cename bib'#3\endcsname}%
  }%
  \@tempa
  \ifx\@empty#4\exp\@gobble % end the recursion
  \else \ifx +#4\else\bibspectoscan@error\fi
  \fi
  \bibspectoscan
}
```

Accumulate spec material in `\toks@`, then define `\setbib@moo` from it.

```
\newcommand{\BibSpec}[2]{%
  \toks@\@emptytoks
  \ifnotempty{#2}{%
    \ifnextchar+{\exp\bibspectoscan\@gobble}{\bibspectoscan}#2%
    \@empty\@empty\@empty\@empty
  }%
  \exp\edef\cename setbib#1\endcsname{\the\toks@}%
}
```

I made this a `\def` rather than a `\let` because using `\let` would make `\BibSpecAlias` statements order-sensitive in a way that seems frequently to be a stumbling block to unwary package writers. But then we should probably do at least the simplest kind of infinite loop check.

```
\newcommand{\BibSpecAlias}[2]{%
  \@xp\def\@xp\@tempa\@xp{\csname setbib@#1\@xp\endcsname}%
  \@xp\ifx\csname setbib@#2\endcsname\@tempa
    \PackageError{amsrefs}{%
      Mirror alias #1->#2 not allowed (infinite loop)}\@ehc
  \else
    \@xp\def\csname setbib@#1\@xp\endcsname
    \@xp{\csname setbib@#2\endcsname}%
  \fi
}
```

### 13.11 Name handling

When dealing with author or editor names in a `\BibSpec`, it is not easy to design some way of specifying the desired style that is flexible enough to handle the multitude of different styles needed in practice. As a first level of indirection, we expect that the `\BibSpec` will typically start by applying a function such as `\PrintAuthors` to the list of names. At the point of application, the name list will have the form

```
\name{firstauthor}\name{secondauthor}...
```

Because the formatting may well depend on the number of names that are present, we first run a `\NameSetup` macro that looks at the number of names and prepares a list of functions to be applied to each name in the list. This method allows us to specify the internal formatting of an author name with the same kind of specifications as are used in a general `\BibSpec`.

```
\newcommand{\PrintNames}[4]{%
  \begingroup \NameSetup{#1}{#4}%
  #2#4#3\relax
  \edef\@tempa{\seriesdefault}\edef\@tempb{\f@series}%
  \ifx\@tempa\@tempb \else \CarryFontSeries \fi
  \endgroup
}

\providecommand{\bysame}{\leavevmode\hbox to3em{\hrulefill}\thinspace}
\newcommand{\sameauthors}[1]{\bysame}
\def\PreviousAuthors{\relax}

\newcommand{\AuthorList}[1]{\PrintNames{author}{-}{-}{#1}}%
\newcommand{\PrintAuthors}[1]{%
  \ifx\PreviousAuthors\bib@author
    \begingroup \aftergroup\sameauthors \let\AuthorList\endgroup
  \else
    \global\let\PreviousAuthors\bib@author
  \fi
  \AuthorList{#1}%
}
```

```

\def\bib@name@init{%
  \let\bib'surname\@empty \let\bib'given\@empty
  \let\bib'jr\@empty \let\bib'initials\@empty
}

```

When specifying the format of author names, we distinguish four cases: first author, co-author, middle author, and last author. By breaking down the specifications to this level, we make it easier to handle special requirements such as inverting the first author's name but printing the remaining names in normal order.

```

\IfOption{initials}{% TRUE:
  \BibSpec{firstauthor}{
    +{}{}{initials}
    +{}{ }{surname}
    +{}{ }{jr}
  }
  \BibSpec{coauthor}{
    +{}{ and}{transition}
    +{}{ }{initials}
    +{}{ }{surname}
    +{}{ }{jr}
  }
  \BibSpec{middleauthor}{
    +{,}{ }{transition}
    +{}{ }{initials}
    +{}{ }{surname}
    +{}{ }{jr}
  }
  \BibSpec{lastauthor}{
    +{,}{ and}{transition}
    +{}{ }{initials}
    +{}{ }{surname}
    +{}{ }{jr}
  }
}{% initials? FALSE:
  \BibSpec{firstauthor}{
    +{}{}{given}
    +{}{ }{surname}
    +{}{ }{jr}
  }
  \BibSpec{coauthor}{
    +{}{ and}{transition}
    +{}{ }{given}
    +{}{ }{surname}
    +{}{ }{jr}
  }
  \BibSpec{middleauthor}{
    +{,}{ }{transition}
    +{}{ }{given}
    +{}{ }{surname}
  }
}

```

```

    +{}{ }{jr}
  }
  \BibSpec{lastauthor}{
    +{,}{ and}{transition}
    +{}{ }{given}
    +{}{ }{surname}
    +{}{ }{jr}
  }
} % end conditional code for initials option

```

The Chicago Manual of Style suggests that it is slightly better not to italicize ‘et al’ and some other extremely common abbreviations inherited from Latin. (Compare ‘etc’.)

```

\newcommand{\etaltext}{et al.}
\newcommand{\SubEtal}[1]{\etaltext}

```

Some “et alii” requirements can also be handled this way, e.g., if two authors should be printed as “A and B” but three or more should be printed as “A et al.”, it could be done readily enough by changing only the specs for middleauthor and lastauthor:

```

\BibSpec{middleauthor}{ }
\BibSpec{lastauthor}{
  +{}{ \SubEtal}{surname}
}

```

For more complicated et alii rules, well, just throw your brain into gear and think of something clever. I think you will find enough points of attack to make it possible one way or another.

When we consider editor names we have to think about some further complications. First, for the case of a book where editor names are listed in place of author names, just copy the same style with a bit of added text at the end.

```

\newcommand{\PrintEditorsA}[1]{%
  \PrintNames{editor}{\bfseries}{ (ed\Plural{s}.)}{#1}%
}

\BibSpecAlias{firsteditor}{firstauthor}
\BibSpecAlias{coeditor}{coauthor}
\BibSpecAlias{middleeditor}{coeditor}
\BibSpecAlias{lasteditor}{coeditor}

\newcommand{\PrintEditorsB}[1]{%
  \PrintNames{ed}{(\}\SwapBreak{,}~ed\Plural{s}.)}{#1}%
}

\BibSpec{firsted}{
  +{}{ }{initials}
  +{}{ }{surname}
  +{}{ }{jr}
}
\BibSpec{coed}{
  +{}{ and }{initials}
  +{}{ }{surname}
}

```

```

+{}{ }{jr}
}
\BibSpec{middleed}{
+{,}{ }{initials}
+{}{ }{surname}
+{}{ }{jr}
}
\BibSpec{lasted}{
+{,}{ and }{initials}
+{}{ }{surname}
+{}{ }{jr}
}

```

So what does `\NameSetup` do anyway (you may ask)?

```

\def\NameSetup#1{%
  \@xp\NameSetup@a
  \csname setbib@first#1\@xp\endcsname
  \csname setbib@co#1\@xp\endcsname
  \csname setbib@middle#1\@xp\endcsname
  \csname setbib@last#1\endcsname
}%

```

`\NameSetup@a` first builds a queue consisting of, e.g.,

```

\setbib@firstauthor
\setbib@middleauthor \setbib@middleauthor ...
\setbib@lastauthor

```

and then checks to see if `\name@queue = \setbib@firstauthor \setbib@lastauthor`, because that means there were only two authors; and then we substitute `\setbib@coauthor` for the second token.

```

\def\NameSetup@a#1#2#3#4#5{%
  \def\name##1{\@nx#3}%
  \edef\name@queue{\@nx#1@gobblefour#5\@nx#4\@empty\@empty}%
  \def\@tempa{#1}%
  \ifx\name@queue\@tempa \let\SingularPlural\@firstoftwo
  \else \let\SingularPlural\@secondoftwo
  \fi
  \def\@tempa{#1#4}%
  \ifx\name@queue\@tempa\def\name@queue{#1#2}\fi
  \let\name\doName
}

\def\doName#1{%
  \iffalse{\fi \@xp\get@namer\name@queue}%
  \name@split#1,{},{},\@nil \setbib@name
}

```

Short for `get-name-handler`.

```

\def\get@namer#1{\let\setbib@name#1%
  \@xp\def\@xp\name@queue\@xp{\iffalse}\fi
}

```



Some tests of various author name forms.

```

()->[,] [0] []
(Abiteboul)->[A] [biteboul] [0]
(S. Abiteboul)->[S] [. Abiteboul] [0]
(S. Abiteboul )->[S] [. Abiteboul ] [0]
(S. T. Abiteboul)->[S] [. T. Abiteboul] [0]
(S.T. Abiteboul)->[S] [.T. Abiteboul] [0]
(Steve Abiteboul)->[S] [teve Abiteboul] [0]
(Abiteboul, S.)->[A] [biteboul] [S]
(Abiteboul, S. T.)->[A] [biteboul] [S]
(Abiteboul, S.T.)->[A] [biteboul] [S]
(P. Kanellakis)->[P] [. Kanellakis] [0]
(K. I. Be\u {i}dar)->[K] [. I. Be\u {i}dar] [0]
(\protect \SubEtal )->[\protect ] [\SubEtal ] [0]

```

If `arg3 = @` then the name is probably given in uninverted order. This may be because it is a Chinese name, and that is the correct order; but check to see if the name starts with an initial, which probably should get a warning.

```
\def\EmptyNameWarning{\amsrefs@warning{Empty author or editor name}}
```

Need to check for extra braces here.

```

\def\NameCheck#1#2#3\@nil{%
  \def\@tempa{#1#2}%
  \edef\@tempa{\@nx\NameCheck@a\macrotext\@tempa}%
  \@tempa ??\@nil
}

```

This gets rid of the leading space in `\on@line`.

```
\def\MessageBreakNS{\MessageBreak\romannumeral'\^^@}
```

```

\def\NameCheck@a#1#2#3\@nil{%
  \if.#2\ifnum\catcode'#1=11
    \amsrefs@warning{%
Write 'Lastname, First' to ensure proper formatting\MessageBreakNS}%
  \fi\fi
}

```

```

\def\name@split#1,#2#3,#4#5,#6\@nil{%
  \bib@name@init
  \def\bib'surname{#1}%
  \ifx\bib'surname\@empty \EmptyNameWarning\fi
  \def\bib'given{#2#3}%
  \def\bib'jr{#4#5}%
  \ifx\@empty\bib'given \NameCheck #1 ??\@nil

```

Throwing in an extra period at the end makes this work even when the given names consist of a single letter with no period or anything. I think. [mjd,2002-02-18]

```

  \else \extract@initials{#2#3\ignorespaces.}%
  \fi
}

```

Extracting initials from the author name is an arduous chore, because of the various cases that need to be handled:

```
\doName{Harish, \'{E}tienne-P\^{i}erre}
\doName{Jones, H. C.}
\doName{Jones, H.-C.}
\doName{Jones, H.C., Jr.}
\doName{Jones, Harold, IV}
\doName{\'Swiderski, Jacek},
\doName{\'S}widerski, Jacek},
\doName{\'S}widerski, Jacek},
\doName{Cartan, \\'Elie}
\doName{Cartan, \\'E}lie}
\doName{Cartan, \\'E.}
\doName{Shua Tae Yua}
\doName{Shua, Tae Yua}
\doName{Harish-Chandra}
```

So we do it in several steps. The result that we want to end up with is defining `\bib'initials` to contain, e.g.,

```
Jones, Harold C. --> H\InitialPunct C\InitialPunct
```

1. Expand accent commands in a way that replaces an accented letter with only the base letter, if it is lowercase (keep the accent command if the base letter is uppercase).
2. Convert periods to spaces.
3. Add a space before hyphens, to ensure that `\InitialPunct` will get added in the middle of a hyphenated compound name.

```
\def\xi@accent#1#2{%
  \ifnum\uccode'#2='#2 \@nx#1{#2}\else #2\fi
}
```

This reads up to the next period and replaces it by a space, then recurses. The `\@gobbletwo` terminates the recursion done by `\xi@hyph`.

```
\def\xi@dot#1.{\xi@hyph#1@\space\@gobbletwo - \xi@dot}
```

This reads up to the next hyphen and adds a space before it, then recurses.

```
\def\xi@hyph#1-#1 -\xi@hyph}
```

```
\def\extract@initials#1{%
  \begingroup
  \def\i{i}\def\j{j}%
  \def\ae{a}\let\oe\ae \let\o\ae \let\dh\ae \let\dj\ae \let\l\ae
  \let\ng\ae \let\ss\ae \let\th\ae
  \def\"{\xi@accent\"}\def\'{\xi@accent\'}\def\.{\xi@accent\.%}
  \def\={\xi@accent\=}\def\^{\xi@accent\^}\def\`{\xi@accent`\}%
  \def\~{\xi@accent\~}\def\b{\xi@accent\b}\def\c{\xi@accent\c}%
  \def\d{\xi@accent\d}\def\H{\xi@accent\H}\def\k{\xi@accent\k}%
  \def\r{\xi@accent\r}\def\t{\xi@accent\t}\def\u{\xi@accent\u}%
  \def\v{\xi@accent\v}%
}
```

The use of `\@gobbletwo` here is to terminate the recursion done by `\@xidot` and `\xi@hyph`.

```

\protected@edef\i{\xi@dot#1\@gobbletwo -\@gobbletwo .\@empty\space}%
\def\j{\uccode\fam=64 \advance\fam\@ne
  \ifnum\fam>122 \@firstoftwo \fi
  \j
}%
\fam=97 \j
\uppercase\exp{\@xp\def\@xp\i\@xp{\i}}%
\let\InitialSpace=F%
\@xp\extract@initials@b\i @@ \relax
\edef\j{\def\@nx\bib'initials{\the\toks@}}%
\expandafter\endgroup\j
}

\def\extract@initials@b#1#2@{%
  \ifx @#1\@xp\@gobbletwo
  \else
    \ifx F\InitialSpace
      \toks@{\#1#2\ini@punct}%
      \let\InitialSpace=T%
    \else
      \toks@\@xp{\the\toks@ \ini@space #1#2\ini@punct}%
    \fi
  \fi
  \extract@initials@c
}

\def\extract@initials@c#1 {\extract@initials@b}

\def\ini@punct{\InitialPunct}
\newcommand{\InitialPunct}{.}
\def\ini@space{\futurelet\@let@token\ini@space@a}
\def\ini@space@a{\ifx -\@let@token \else\InitialSpace\fi}
\newcommand{\InitialSpace}{\nobreakspace}

```

This should probably get some extra work to handle the possibility that a name was entered in the bibliography in normal (uninverted) order. [mjd,2000/04/07]

```

\def\lastName#1{\lncan@a#1,\@nil}
\def\lncan@a#1,#2\@nil{#1}

\def\discardName#1{}

\newcommand{\CiteNames}[1]{%
  \PrintSeries{\name}%
  {\lastName}%
  {}{ and \lastName}%
}

```

For three or more names: print 'et al' instead of the last name. Have to putz around with the spacefactor a bit or the comma between name and year will not be applied.

```

    {}{\discardName}%
    {}{ \etaltext\@{\discardName}%
    {}%
    {#1}%
    {}%
}
This needs to be called at the beginning of a list of cites to reset a few things.
\def\cites@init{%
  \gdef\prev@names{???}\let\cites@init\@empty
}
\def\PrintCiteNames#1{%
  \leavevmode
  \def\@tempa{#1}%
  \ifx\@tempa\prev@names
  \else
    \gdef\prev@names{#1}%
    \@xp\ifx\@car#1.\@nil\CitePrintUndefined
    #1\relax
  \else
    \CiteNames{#1}%
  \fi
\fi
}
\def\PrintCNY#1#2{%
  \PrintCiteNames{#1}%
  \@ifnotempty{#2}{\@addpunct{,} #2}%
}

```

### 13.12 Special formatting for other fields

Reviews are handled as a list to support the theoretical possibility of multiple reviews.

```

\newcommand{\ReviewList}[1]{%
  \PrintSeries{\review}{,}{ }{,}{ }{,}{ }{ }{#1}{ }%
}

```

And similarly for ISBN numbers. There seem to be a few different situations where one book might have two different ISBN numbers. Here are the ones I know of so far [mjd,2002-02-18]: separate ISBN numbers for hardback and paperback; separate ISBN numbers for U.S. edition and European edition.

```

\newcommand{\ISBNList}[1]{%
  \PrintSeries{\isbn}{,}{ }{,}{ }{,}{ }{ }{ISBN }{#1}{ }%
}
\newcommand{\voltext}{vol.~}

```

Scan the contents of a page value to see if it is a single page. Presence of \ndash or hyphen is taken to mean no. Probably should test also for spaces and commas. [mjd,2000/01/24]

```

\newcommand{\DashPages}[1]{%

```

```

    p\pp@scan@a#1\ndash p\ndash{\pp@scan#1@p@-{}@nil}\@nil.~#1%
  }
  \def\pp@scan#1-#2@-#3#4@nil{#3}
  \def\pp@scan@a#1\ndash#2@ndash#3#4@nil{#3}

```

If we have eprint info and pages info and no journal name, the pages information is presumably the number of pages in the eprint.

```

  \newcommand{\eprintpages}[1]{%
    #1\IfEmptyBibField{eprint}{}\IfEmptyBibField{journal}{ pp.}{}}%
  }

  \newcommand{\EnglishInitialCaps}[1]{%
    \ifx\@empty\bib@language \let\bib@language\biblanguagedefault\fi
    \ifx\bib@language\biblanguagenglish \exp\inicap\fi
    {#1}%
  }

  \def\PrintThesisType#1{%
    \thesis@type#1?\@nil{#1}%
  }
  \def\thesis@type#1#2\@nil#3{%
    \ifx p#1Ph.D. Thesis%
    \else\ifx m#1Master's Thesis%
    \else #3\fi\fi
  }

```

Perhaps need to add allowbreak penalties at the parens in a DOI. Also what about prohibiting a break after the leading S?

```

  \newcommand{\PrintDOI}[1]{%
    DOI #1%
    \IfEmptyBibField{volume}{, (to appear in print)}{}}%
  }

```

When this function is called, \bib@year has been copied into \bib@date if necessary.

[This code has gotten sort of circular, it seems. Needs reassessment [mjd,2000/04/07]]

```

  \def\bib@parsedate{%
    \exp\bib@parsedate@a\bib@date ---\@nil
  }
  \let\bib@year\@empty
  \let\bib@month\@empty
  \let\bib@day\@empty
  \def\bib@parsedate@a#1-#2-#3-#4@nil{%
    \def\bib@year{#1}\def\bib@month{#2}\def\bib@day{#3}%
    \ifx\@empty\bib@month \let\bib'date\bib@year
    \else \def\bib'date{#1-#2-#3}%
    \fi
  }

```

Print date in different forms depending on DOI and volume information.

```

  \newcommand{\PrintDatePV}[1]{%

```

```

\IfEmptyBibField{doi}{\let\@tempa\PrintDate}{%
  \IfEmptyBibField{volume}{\let\@tempa\PrintDatePosted}{%
    \let\@tempa\PrintDate}}%
\@tempa{#1}%
}

```

Intent is to handle variations such as 1987, August 1987, 1987-08, and 1987-08-14. If the month is present, print August or Aug. or 08 or nothing, at the behest of the bib style.

We've taken some special care to parse out the date info ahead of time, so this function just discards arg 1 and uses the already-parsed value.

```

\newcommand{\PrintDate}[1]{(\print@date)}
\newcommand{\PrintDateB}[1]{\print@date}
\def\print@date{%
  \ifx\bib@month\@empty \else\print@month@day \fi
  \bib@year
}

```

With the Babel package, month names for a given language are typically available in a macro `\month@language`:

```

\def\month@german{\ifcase\month\or
  Januar\or Februar\or M"arz\or April\or Mai\or Juni\or
  Juli\or August\or September\or Oktober\or November\or Dezember\fi}

```

However this is not true for English.

```

\def\print@month@day{%
  \ifcase 0\bib@month\ignorespaces
  \or January\or February\or March\or April\or May\or June\or
    July\or August\or September\or October\or November\or December\or
    Winter\or Spring\or Summer\or Fall\else Unknown Month%
  \fi
  \ifx\@empty\bib@day \else \space\number 0\bib@day,\fi
  \space
}

```

You can use `\PrintYear` if you want to suppress month/day even when supplied in the data.

```

\newcommand{\PrintYear}[1]{\bib@year}
This one is special for AMS use.
\newcommand{\PrintDatePosted}[1]{\unskip, posted on \print@date}
\newcommand{\CardinalNumeric}[1]{%
  \number#1\relax
  \if\ifnum#1<14 \ifnum#1>\thr@@ T\else F\fi\else F\fi T%
  th%
  \else
  \@xp\keep@last@digit\@xp#1\number#1\relax
  \ifcase#1th\or st\or nd\or rd\else th\fi
  \fi
}
\def\keep@last@digit#1#2{%

```

```

\ifx\relax#2\@xp\@gobbletwo
\else #1=#2\relax
\fi
\keep@last@digit#1%
}

\newcommand{\PrintEdition}[1]{%
\afterassignment\print@edition
\count@ 0#1\relax\@nil
}

\newcommand{\editiontext}{ed.}

```

If the number assignment swept up all the contents, produce a cardinal number from \count@.

```

\def\print@edition#1#2\@nil{%
\ifx\relax#1\relax
\ifnum\count@>\z@ \CardinalNumeric\count@
\else ??th%
\fi
\ \editiontext
\else \ifnum\count@>\z@\number\count@\fi #1#2\relax
\fi
}

```

The braces here are just a simple way to terminate the number scanning.

```
\newcommand{\SentenceSpace}{\relax\ifhmode{\spacefactor3000} \fi}
```

For now, this does nothing. Could do a url/hyperlink or something.

```
\newcommand{\eprint}[1]{#1}
```

The [www.arXiv.org](http://www.arXiv.org) recommendations for citing their eprints are found at <http://xxx.lanl.gov/help/faq/references>, including these examples:

```

arXiv:hep-th/9910001
arXiv:math.AT/9910001
arXiv:physics.acc-ph/9911027

```

```

\BibSpec{article}{%
+{ }\PrintAuthors} {author}
+{,}{ \textit} {title}
+{.}{ \textit} {subtitle}
+{,}{ } {journal}
% +{,}{ ISSN } {ISSN}
+{ } { \textbf} {volume}

```

The date form is tricky depending on presence or absence of DOI.

```

+{ } { \PrintDatePV} {date}
+{,}{ \PrintDOI} {doi}
+{,}{ \eprint} {eprint}
+{ } { \parenthesize}{status}
+{,}{ \eprintpages} {pages}
+{,}{ } {note}
+{.}{ } {transition}

```

```

+{} {\SentenceSpace \ReviewList} {review}
+{}{ \parenthesize}{language}
+{}{}{part}
}
\BibSpec{book}{%
+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{,}{ \textit}{title}
+{:}{ \textit}{subtitle}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ \PrintEdition}{edition}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{place}
+{,}{ \PrintDateB}{date}
+{,}{ \ISBNList}{isbn}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{collection.article}{%
+{}{\PrintAuthors}{author}
+{,}{ \textit}{title}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ \PrintEdition}{edition}
+{}{ \PrintEditorsB}{editor}
+{,}{ Proc.\ }{conference}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{place}
+{,}{ \PrintDateB}{date}
+{,}{ \DashPages}{pages}
+{,}{ \ISBNList}{isbn}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{report}{%

```



```

+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{,}{ \textit}{title}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ Technical Report }{number}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{institution}
+{,}{ }{place}
+{,}{ \PrintDateB}{date}
+{,}{ \ISBNList}{isbn}
+{,}{ \eprint} {eprint}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{thesis}{%
+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{,}{ \textit}{title}
+{,}{ \PrintThesisType}{type}
+{,}{ part~}{part}
+{,}{ }{organization}
+{,}{ }{institution}
+{,}{ }{place}
+{,}{ \PrintDateB}{date}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}

\BibSpecAlias{periodical}{book}
\BibSpecAlias{collection}{book}
\BibSpecAlias{proceedings}{book}
\BibSpecAlias{manual}{book}
\BibSpecAlias{misc}{book}
\BibSpecAlias{unpublished}{book}
\BibSpecAlias{proceedings.article}{collection.article}
\BibSpecAlias{techreport}{report}

\edef\setbib@incollection{%
 \@xp\@nx\csname setbib@collection.article\endcsname
}

```

```
\edef\setbib@inproceedings{%
  \exp\@nx\csname setbib@collection.article\endcsname
}
```

Some more entry types for implementing abbreviations.

```
\BibSpec{journal}{%
  +{}{}{journal}
  +{}{ \parenthesize}{shortjournal}
  +{,}{ ISSN }{issn}
}
\BibSpec{person}{%
  +{}{\PrintAuthors}{name}
}
\BibSpec{publisher}{%
  +{,}{ }{publisher}
  +{,}{ }{organization}
  +{,}{ }{institution}
  +{,}{ }{place}
}
```

Some special handling for “et alii” or “and others”.

```
\DefineName{alii}{\etaltext}%
\DefineName{others}{\etaltext}%
```

### 13.13 Extracting entries from an external database file

If you have a  $\LaTeX$  document that contains `amsrefs`-style `\bib` entries, you can use it as a database and extract items from it for use in another document. In typical relatively simple scenarios, the extraction can be done by  $\LaTeX$  itself on the first pass, so that citations in the text will be successfully resolved on the second pass (possibly even the first, depending on what kind of bibliography sorting is used).

```
\newread\bib@dbfile
\newcommand{\ReadBibData}[1]{%
  \IfFileExists{#1.ltb}{%
    \openin\bib@dbfile=@filef@und \relax
  }{%
    \IfFileExists{#1.ltx}{%
      \openin\bib@dbfile=@filef@und \relax
    }{%
      \IfFileExists{#1.tex}{%
        \openin\bib@dbfile=@filef@und \relax
      }{%
        \begingroup \NoBibDBFile{#1}%
        \let\ReadBibPrelim\endgroup
      }%
    }%
  }%
  \ReadBibPrelim
}
```

Maybe this should have a star form to mean, read everything into memory? Then it could be used at begin-document to make all the info available from the get-go. [mjd,2001-12-13]

```

\def\bblname{\jobname}
\newcommand{\bibselect}{%
  \ifstar{\let\@bibdef\copy@bibdef \BibSelect}{\BibSelect}%
}
\newcommand{\BibSelect}[2][\bblname]{%
  \if@filesw
    \typeout{Trying to create bbl file '#1.bbl' ...}%
    \def\bibselect@msg{\typeout{ ... rats. Unable to create bbl file.}}%
    \let\@open@bbl@file\OpenBBLFile
    \ifx\@bibdef\copy@bibdef \else \let\@bibdef\selective@bibdef \fi
    \ReadBibData{#2}%
  \fi
  \@close@bbl@file
  \let\@bibdef\normal@bibdef
  \input{#1.bbl}%
}
\def\NoBibDBFile#1{%
  \amsrefs@warning{No data file #1.ltb (.ltx, .tex) found}%
}

```

Start reading the db file one line at a time, looking for `\begin{biblist}`.

```

\def\ReadBibLoop{%
  \ifeof\bib@dbfile
    \closein\bib@dbfile
    \EmptyBibDBFile
    \xp@gobble
  \else
    \read\bib@dbfile to\CurLine
    \lowercase{\xp\ReadBibLoop@a\CurLine} \@nil
  \fi
  \ReadBibLoop
}
\def\ReadBibPrelim{%
  \edef\bib@providefile{\@nx\ProvidesFile{\@filef@und}\relax}%
  \begingroup
  \let\do\@makeother \dospecials

```

Spaces and comments can simply be ignored, and that makes our scanning task easier.

```

  \catcode32=9 \catcode'\%=14 \relax
  \ReadBibLoop
  \endgroup
  \bib@providefile
}
\edef\BibListMarker{\@backslashchar begin\string{biblist}\string}}
\long\def\ReadBibLoop@a#1 #2\@nil{%

```

```

\def\@tempa{#1}%
\ifx\@tempa\BibListMarker
  \begingroup \def\ReadBibLoop{\endgroup\ReadBibEntries}%
\fi
}

\def\ReadBibEntries{%
  \endgroup % turn off the mostly-verbatim catcodes
  \ReadBibEntry
  \begingroup % pair for upcoming endgroup
}

\def\ReadBibEntry{%
  \ifeof\bib@dbfile
    \closein\bib@dbfile
    \@xp@gobble
  \else
    \read\bib@dbfile to\CurLine
    \ifx\space\CurLine
      \else \ifx\@empty \CurLine
        \else \@xp\ReadBibLoop@e\CurLine\@nil
      \fi\fi
    \fi
  \ReadBibEntry
}

\long\def\ReadBibLoop@e#1#2\@nil{%
  \ifx\bib#1%
    \CurLine % just exec it
  \else \ifx\end#1\begingroup\let\ReadBibEntry\endgroup\fi
\fi
}

\let\bbl@out=\relax
\let\bbl@write\@gobble
\let\@open@bbl@file\relax
\let\@close@bbl@file\relax
\def\OpenBBLFile{%
  \if@filesw
    % Just use the next unused output stream
    \count@\count17 \advance\count@\@ne
    \ifnum\count@<\sist@n
      \global\chardef\bbl@out=\count@
      \immediate\openout\bbl@out=\bblname.bbl\relax
      \global\let\@close@bbl@file\CloseBBLFile
      \gdef\bbl@write{\immediate\write\bbl@out}%
    \else
      \ch@ck\count@\sist@n\write
    \fi
  \fi
  \global\let\@open@bbl@file\relax
}

```

```

\def\CloseBBLFile{%
  \immediate\closeout\bbl@out\relax
  \global\let\@close@bbl@file\relax
  \global\let\bbl@write@gobble
  \global\let\bbl@out\relax
}

```

### 13.14 Cites

These variables are named to follow the precedent set by Arseneau’s `cite` package. `\citepunct` is used to separate multiple cites; `\citemid` is used to separate a cite number from additional information such as “Theorem 4.9”.

```

\def\citeleft{[]}
\def\citeright{[]}
\def\citemid{\penalty9999 \space}
\def\citepunct{\penalty9999 \hskip.13em plus.1em minus.05em\relax}
\def\citeform#1{}

```

The following definition provides some indirection that helps to deal with author-year object cites.

```
\def\@citeleft{\citeleft}
```

The information used by `\cite` for key `moo` is stored in `\b@moo` in the form `\citesel{status1}{status2}{number}{year}{backref-info}`

The first status flag is 1 if this key has already been cited earlier in the same document; 0 if not yet. This is used in some bibliography schemes to print a full list of author names for the first citation and an abbreviated author list for subsequent citations.

The second status flag is 1 if this key has already been used by a define-cite command (such as `\bib`); 0 otherwise. This makes it possible to issue a warning message as soon as the conflict is seen, on the first `LATEX` run, instead of on a subsequent run during the processing of the `.aux` file.

When an author/year citation scheme is in use, args 3 and 4 hold resp author names and year. Otherwise arg 3 simply holds a cite number.

And finally, arg 5 holds a list of backref pointers indicating the locations in the document where this entry has been cited.

```

\def\citesel@author#1#2#3#4#5{\PrintCiteNames{#3}}
\def\citesel@authoryear#1#2#3#4#5{\PrintCNY{#3}{#4}}
\def\citesel@object#1#2#3#4#5{\PrintCiteNames{#3} \citeleft#4}
\def\citesel@year#1#2#3#4#5{#4}
\def\citesel@number#1#2#3#4#5{#3}
\let\citesel\citesel@number

\def\citesel@update#1#2#3#4#5#6{%
  \gdef#6{\citesel 1#2{#3}{#4}{#5}}%
  \if 0#1\relax \g@addto@macro\all@cites{#6}\fi
}

\def\citesel@backrefs#1#2#3#4#5{%
  \@for\@tempc:=#5\do{\@xp\backref\@xp{\@tempc}}%
}

```

```
\def\backref#1{\toks@{#1}\typeout{backref=[\the\toks@]}}
%
```

Here is the difference between the various optional forms of \cite:

```
\cite{xyz} -> \cite@a\citesel{xyz}{-}{-}
           -> \cite@bc\b@xyz\citesel{}
```

```
\cite{xyz}*{blub} -> \cite@a\citesel{xyz}{-}{blub}
                  -> \cite@bc\b@xyz\citesel{blub}
```

```
\cite[blub]{xyz} -> \cite@a\citesel{xyz}{blub}{-}
                  -> \cite@bc\b@xyz\citesel{blub}
```

Need to handle the standard [...] option for compatibility's sake.

```
\newcommand{\InnerCite}[1]{\star@\cite@a\citesel{#1}}{-}{-}
\renewcommand{\cite}[2][{}]{%
  \if\cite@single#2,\@gobble \else\MultipleCiteKeyWarning{#2}{#1}\fi
  \@ifempty{#1}{-}{%
    \cites@o{#2}%
  }{-}%
  \ObsoleteCiteOptionWarning
  \cites@a{*{#1}}{#2}%
  }{-}%
}
```

```
\edef\cite@single#1,#2{\iffalse{\fi\iffalse{\fi\string}#2.\string}}
```

A list of simple cites. Make it robust in case used inside a figure caption.  
(But then also, by the way, listoffigures should provide special handling.)

```
\DeclareRobustCommand{\cites}{\cites@a{}}
\def\cites@o#1{\star@\cites@oo{#1}}{-}{-}
\def\cites@oo#1#2{\@ifempty{#2}{\cites@a{#1}}{\cites@a{*{#2}}{#1}}}
\def\cites@a#1#2{%
  \begingroup
  \toks@\endgroup \cites@b{#1}}%
  \vdef\@tempa{#2}%
  \edef\@tempa{\the\toks@ \@firstofone{\@xp\zap@space\@tempa \@empty}%
  \@tempa,\@empty
  \edef\@tempa{\endgroup\@nx\citelist{\the\toks@}}%
  \@tempa
}
\def\cites@b#1#2,#3{%
  \begingroup
  \toks@\InnerCite{#2}{#1}%
  \ifx\@empty#3\@xp\@gobble\fi
  \cites@c#3%
}
\def\cites@c#1,#2{%
  \toks@\@xp{\the\toks@ \InnerCite{#1}}%
  \ifx\@empty#2\@xp\@gobble\fi
```

```

\cites@c#2%
}

```

Grouping that encloses an entire cite block (a single cite or a list of cites).

```

\def\cite@begingroup{\begingroup\let\cite@begingroup\relax}
\let\cite@endgroup\endgroup

```

The job of `\cite@a` is to convert the cite key to all catcode-12 characters before passing it on to `\cite@b`.

```

%% #1<-\citesel@year #2<-key
\def\cite@a#1#2{%
  \cite@begingroup
  \cites@init
  \let\citesel#1\relax
  \ifx\citesel\citesel@author \let\citeleft\@empty \let\citeright\@empty\fi
  \begingroup
  \toks@{\endgroup \cite@b}%
  \vdef\@tempa{#2}%
  \edef\@tempa{\the\toks@\@firstofone{\@xp\zap@space\@tempa} \@empty}}%
  \@tempa
}

% #1<-key #2<-star-optional-arg
\def\cite@b#1#2{%
  \@xp\cite@bc\csname b@#1\@xp\endcsname {#1}{#2}%
}

```

If it's uninitialized, plug in an empty cite structure. `\cite@bc` should be executed only once for a given instance of a cite key. All further processing should go through `\cite@cj`.

```

\def\cite@bc#1#2{%
  \def\CurrentCite{#2}%
  \ifx#1\@undefined \global\let#1\relax\fi
  \ifx#1\relax \global\let#1\empty@cite \fi
  \@xp\cite@nobib@test#1{}{}{} \@nil#1%
  \cite@cj#1%
}
\def\empty@cite{\citesel 00{}{}{}}

```

If arg 4 is empty, it means there wasn't any `\bib` command that defined a valid number.

```

% #1 \citesel #2 0 #3 0 #4 number #5 etc
\def\cite@nobib@test#1#2#3#4#5\@nil#6{%
  \@ifempty{#4}{%
    \G@refundefinedtrue
    \UndefinedCiteWarning
    \xdef#6{\@nx\citesel #2#3{%
      \@nx\CitePrintUndefined{\CurrentCite}}{}{}}%
  }{}%
}

```

```
\DeclareRobustCommand{\CitePrintUndefined}[1]{%
  \begingroup\fontshape{n}\fontseries\mddefault \ttfamily ?#1\endgroup
}
```

This has to be a `\let`, not a `\def`.

```
\let\CPU@normal\CitePrintUndefined
%
\def\cite@multiple#1,#2#3\@nil{\ifx\relax#2F\else T\fi T}
\def\MultipleCiteKeyWarning#1#2{%
  \amsrefs@warning{%
    Use of \string\cites\space is recommended instead of %
    \string\cite\space\MessageBreak
    for multiple cites '#1'}%
  \@ifnotempty{#2}{%
    \amsrefs@warning{Star option requires \string\citelist\space here}%
  }%
  \global\let\MultipleCiteKeyWarning\@gobbletwo
}
```

```
\citesel{cite-already?}{bib-already?}{number}{year}{backrefs}
```

```
\def\ObsoleteCiteOptionWarning{%
  \amsrefs@warning{%
    The form \string\cite{...}*{...} is recommended\MessageBreak
    instead of \string\cite[...]{...}%
  }%
  \global\let\ObsoleteCiteOptionWarning\@empty
}
```

```
\def\ar@hyperlink#1{\hyper@link [cite]{}{cite.\CurrentCite}{#1}}
%% #1<- \b@foo #2<- star-optional-arg
\def\cite@cj#1#2{%
  \leavevmode
  \begingroup
  \cite@cb#1% write info to aux file
  \@citeleft
  \ar@hyperlink{#1}%
  \@ifnotempty{#2}{\citimid{#2}}%
  \citeright \endgroup
  \ignorespaces % when called inside \citelist, a space might follow
  \cite@endgroup
}
```

```
\def\extr@cite{\@xp\@gobblethree\string}
```

This is a copy of the standard warning from `\@citex`.

```
\def\UndefinedCiteWarning{%
  \@latex@warning{%
    Citation '\CurrentCite' on page \thepage\space undefined}%
}
```

Here is the original code for `\nocite`. [mjd,2001-12-04]



```

%\def\nocite#1{\@bsphack
% \@for\@citeb:=#1\do{%
% \edef\@citeb{\expandafter\@firstofone\@citeb}%
% \if@filesw\immediate\write\@auxout{\string\citation{\@citeb}}\fi
% \ifundefined{b@\@citeb}{\G@refundefinedtrue
% \latex@warning{Citation '\@citeb' undefined}}{}}%
% \@esphack}
%\expandafter\let\csname b@*\endcsname\@empty

```

For this special case, we want the entry to be defined but not included in the `\all@cites` list.

```

\@namedef{b@*}{\citesel 11{*}{*}{*}}
\renewcommand{\nocite}[1]{\othercites{#1}}
\newcommand{\othercites}[1]{%
\cite@begingroup \let\cite@endgroup\@empty
\def\citelist{\\othercitelist}%
\cites{#1}%
}
\newcommand{\othercitelist}[1]{%
\cite@begingroup \let\cite@endgroup\@empty
\cites@init \let\citeleft\relax \let\citeright\ignorespaces
\def\InnerCite{\OtherCite}%
\def\cite@cj ##1##2{%
\begingroup \xp@citesel##1%
\cite@cb ##1\endgroup \ignorespaces \cite@endgroup
}%
#1\relax
\endgroup
}
\def\citesel@other#1#2#3#4#5#6{}
\def\OtherCite#1{\cite@a\citesel@other{#1}{}}
\def\cite@cb#1{%
\if@filesw
\immediate\write\@auxout{\string\citation{\CurrentCite}}%
\fi

```

Define `\citesel` to make `\b@whatever` update itself and add itself to the `\all@cites` list if it's not already there.

```

\begingroup \let\citesel\citesel@update #1#1\endgroup
}

```

When processing the aux file at begin-document, this is what `\bibcite` will do:

```

\def\amsRefs@bibcite#1{\xp\bibcite@a\csname b@#1\endcsname}
\def\amsRefs#1{\csname amsRefs@\xp@gobble\string#1\endcsname}
\AtBeginDocument{%
\if@filesw
\immediate\write\@mainaux{%

```

```

        \string\providecommand\string\amsRefs{}%
    }%
\fi
}

%% #1<- \b@foo #2<-{number}{ } or {author}{year} info
\def\bibcite@a#1#2{%

```

Most of the time arg 1 will already be defined, by an earlier `\citedest` command in the aux file. Then we just need to change the number.

```

    \ifx\relax#1\gdef#1{\citesel 00#2{}}%
    \else
        \begingroup
        \@xp\bibcite@b\@xp#1#1{#2}%
        \endgroup
    \fi
}

% #1      #2      #3#4 #5 #6 #7      #8
% \b@foo ->\citesel 00{num}{year}{backrefs} {...}{...}
\def\bibcite@b#1#2#3#4#5#6#7#8{\gdef#1{\citesel#3#4#8{#7}}}
```

The `\citedest` command goes into the aux file to provide back-reference support.

```

\newcommand{\citedest}[1]{\@xp\cite@dest\csname b@#1\endcsname}
\def\cite@dest#1{%
    \ifx\relax#1\gdef#1{\citesel 00{}{}}\fi
    \@xp\cite@dest@b\@xp#1#1}

% #1      #2      #3#4 #5 #6 #7      #8
% \b@foo ->\citesel 00{num}{year}{backrefs} {more-backref-info}
\def\cite@dest@b#1#2#3#4#5#6#7#8{%
    \@ifempty{#7}{%
        \def#1{\citesel #3#4{#5}{#6}{#8}}%
    }{%
        \gdef#1{\citesel #3#4{#5}{#6}{#7,#8}}%
    }%
}

```

Use the `hyperref` methods instead of this [mjd,2001-12-28]

```

\def\BackRefData{section={\thesection},page={\thepage}}
\let\BackRefData\@empty

\let\all@cites\@empty

\DeclareRobustCommand{\citelist}{\citelist@sorted}

\def\NonNumericCiteWarning{%
%% \amsrefs@warning{%
%% Unable to confirm that cite keys are numeric: not sorting%
%% }%
}

```

```

\citelist@sorted{\cite{aaa} \cite{bbb}*{Theorem 4.9} \cite{ccc}}
-> \citeleft
  \cite@cj\b@aaa}\cite@cj\b@bbb{Theorem 4.9}\cite@cj\b@ccc}
\citeright

\def\citelist@sorted#1{%
  \leavevmode
  \citeleft\nopunct % suppress first \citepunct
  \cite@begingroup \let\cite@endgroup\@empty
  \cites@init
  \toks@\@xp{\citepunct}%
  \edef\restore@citepunct{\def\nx\citepunct{\the\toks@}}%
  \def\citeleft{\@addpunct{\citepunct}}%
  \let\citeright\ignorespaces
  \def\cite{\InnerCite}%
  \ifx\citesel\citesel@number
    \cite@sorted@s #1\cite@sorted@e
  else \NonNumericCiteWarning #1\relax
  \fi
  \endgroup
\citeright
}

\def\citelist@unsorted#1{%
  \leavevmode
  \citeleft\nopunct % suppress first \citepunct
  \cite@begingroup \let\cite@endgroup\@empty
  \cites@init
  \def\citeleft{\@addpunct{\citepunct}}%
  \let\citeright\ignorespaces
  \def\cite{\InnerCite}%
  #1\relax
  \endgroup
\citeright
}

```

By defining this as TeX's maxint, undefined cites migrate to the end of a sorted list.

```
\def\CPU@sort#1{2147483647}
```

```
\let\cite@dash\@empty
```

Need to reiterate the definition of `\CurrentCite` because I haven't gotten the grouping complications sorted out yet. [mjd,2001-12-20]

```

\def\cite@print#1#2{%
  \begingroup
  \let\CitePrintUndefined\CPU@normal
  \edef\CurrentCite{\extr@cite#1}%
  \cite@cjs#1{#2}%
  \BackCite
  \endgroup
  \restore@citepunct
}

```

```

}
\let\BackCite\@empty
\@ifundefined{ifBR@verbose}{\let\ifBR@verbose\iffalse \let\fi\fi}{}%
\def\back@cite{%
  \ifBR@verbose
    \PackageInfo{backref}{back cite \string '\CurrentCite\string '}%
  \fi
  \Hy@backout{\CurrentCite}%
}

```

In an AMS-style bibliography, the backref info might follow the final period of the reference, or it might follow some Math Reviews info, without a period.

```

\def\print@backrefs#1{\SentenceSpace$\uparrow$\csname br@#1\endcsname}
\let\PrintBackRefs\@gobble
\def\load@backrefs{\@starttoc{brf}{}}
\def\LoadBackRefs{}
\IfOption{backrefs}{%
  \let\PrintBackRefs\print@backrefs
  \let\LoadBackRefs\load@backrefs
  \let\BackCite\back@cite
  \AtBeginDocument{%
    \@ifundefined{Hy@backout}{%
      \amsrefs@warning{backref option requires hyperref package}%
      \let\BackCite\@empty
    }{}%
  }
}{}%
}

\def\cite@sorted@s{%
  \begingroup
  \let\CitePrintUndefined\CPU@sort
  \let\cite@cj\cite@cj \let\cite@cj\cite@compress
  \begingroup
  \cite@toks\@emptytoks
  \let\cite@cj\cite@sort@prep
  \ignorespaces
}

\def\cite@sort@prep#1#2{%
  \cite@toks\@xp{\the\cite@toks \cite@cj#1{#2}}%
  \ignorespaces
}

\def\cite@sorted@e{%
  \edef\sort@cite@temp{\the\cite@toks}%
  \let\cite@cj\cite@sorted
  \sort@cite@temp
  \edef\7{\endgroup\the\cite@toks}\7\last@cite \endgroup
}

```

```

\newtoks\cite@toks
% #1 \b@foo #2 empty?
\def\cite@sorted#1#2{%
  \afterassignment\@nilgobble
  \@tempcnta 0#1\relax\@nil % highest number so far
  \cite@toks{\cite@cj#1{#2}}%
  \edef\sort@cite@temp{\the\cite@toks}%
  \let\cite@cj\sort@cite@b
  \ignorespaces
}

\def\sort@cite@b#1#2{%
  \afterassignment\@nilgobble
  \@tempcntb 0#1\relax\@nil
  \ifnum\@tempcntb>\@tempcnta
    \cite@toks\@xp{\the\cite@toks \cite@cj#1{#2}}%
    \@tempcnta\@tempcntb
  \else
    \let\cite@cj\sort@cite@c \cite@toks\@emptytoks
    \def\@tempb{\cite@toks\@xp{\the\cite@toks \cite@cj#1{#2}}}%
    \sort@cite@temp \@tempb \let\cite@cj\sort@cite@b
  \fi
  \edef\sort@cite@temp{\the\cite@toks}%
  \ignorespaces
}

\def\sort@cite@c#1#2{%
  \ifnum\@tempcntb<0#1\relax
    \@tempb \let\@tempb\@empty
  \fi
  \cite@toks\@xp{\the\cite@toks \cite@cj#1{#2}}%
  \ignorespaces
}

```

When the time comes to apply compression, we have at our disposal a list of internal cite calls that looks like this:

```
\cite@cj\b@xxx{} \cite@cj\b@yyy{} ...
```

Now we bind `\cite@cj` to a suitable function and execute the list. For compression purposes, we just need to compare the previous number with the next number and keep track of the current state.

0. First number. Just print it, set the state to 1, and set last-cite-number to current-number.
1. If current-number = last-cite-number + 1, then the current number might be a middle number in a range. Save it as "last-cite"; set last-cite-number to current-number; set the state to 2.
- 2a. If current-number = last-cite-number + 1, we are definitely now in the middle (or last number) of a range. Define `\cite@dash` to print a dash; save current-number as "last-cite"; set last-cite-number to current-number; state remains 2.

- 2b. If current-number is NOT equal to last-cite-number + 1, then the previous number was either the second of two, or the end of a three-plus range. Print `\cite@dash` (which in the first case will just be empty), then print `last@cite`. Then do everything for state 0, and set the state to 1, because we might be at the beginning of a new range.
- end. Print `last-cite`. If it happens that there was only a single cite, `last-cite` will be empty and nothing will happen. Otherwise this will finish off the current range or sequence of 2.

```

\let\last@cite\@empty
\def\cite@compress#1#2{%
  \cite@print#1{#2}%
  \@ifempty{#2}{%
    \@tempcnta 0#1\relax \let\cite@cj\cite@compress@a
  }{%
    \let\citepunct\citeAltPunct
  }%
}
\def\cite@dash@cb{%
  \begingroup
  \def\cite@print##1##2{\edef\CurrentCite{\extr@cite##1}\cite@cb##1}%
  \last@cite
  \endgroup
  \let\cite@dash\cite@dash@cb
}
\def\cite@compress@a#1#2{%
  \@ifempty{#2}{%
    \advance\@tempcnta\@ne \@tempcntb 0#1\relax
    \ifnum\@tempcnta=\@tempcntb
      \def\cite@dash{\textendash \nopunct \cite@dash@cb}%
      \def\last@cite{\cite@print#1{#2}}%
      \let\cite@cj\cite@compress@b
    \else
      \cite@print#1{\}\@tempcnta\@tempcntb
    \fi
  }{%
    \cite@print#1{#2}\let\cite@cj\cite@compress
    \let\citepunct\citeAltPunct
  }%
}
\def\cite@compress@b#1#2{%
  \@ifempty{#2}{%
    \advance\@tempcnta\@ne \@tempcntb 0#1\relax
    \ifnum\@tempcnta=\@tempcntb
      \cite@dash
      \def\last@cite{\cite@print#1{#2}}%
    \else
      \last@cite \let\last@cite\@empty
    \fi
  }%
}

```

```

        \cite@print#1{#2}\@tempcnta\@tempcntb
        \let\cite@cj\cite@compress@a
        \fi
    }{%
        \cite@print#1{#2}\let\cite@cj\cite@compress
        \let\citepunct\citeAltPunct
    }%
}

\def\citeAltPunct{; \ }

\IfOption{non-sorted-cites}{%
    \DeclareRobustCommand{\citelist}{\citelist@unsorted}%
}{%
}

\IfOption{alphabetic}{%
    \DeclareRobustCommand{\citelist}{\citelist@unsorted}%
}{%
}

\DeclareRobustCommand{\ycite}[1]{%
    \star@\cite@a\citesel@year{#1}}{%
}

\DeclareRobustCommand{\ycites}{%
    \amsrefs@warning{Not implemented yet: \protect\ycites}%
    \cites
}

\DeclareRobustCommand{\ocite}[1]{%
    \star@\cite@a\citesel@object{#1}}{%
}

\DeclareRobustCommand{\ocites}{%
    \amsrefs@warning{Not implemented yet: \protect\ocites}%
    \cites
}

\DeclareRobustCommand{\citeauthor}[1]{%
    \star@\cite@a\citesel@author{#1}}{%
}

\DeclareRobustCommand{\citeauthorY}[1]{%
    \citeauthor{#1} \ycite{#1}%
}

\DeclareRobustCommand{\fullcite}{%
    \amsrefs@warning{Not implemented yet: \protect\fullcite}%
    \cite
}

\DeclareRobustCommand{\fullocite}{%
    \amsrefs@warning{Not implemented yet: \protect\fullocite}%
    \ocite
}

\IfOption{author-year}{%
    \let\citesel\citesel@authoryear
    \def\citeleft{()\def\citeright{}}%
    \def\@citeleft{\ifx\citesel\citesel@object\else\citeleft\fi}%
}

```

```

\def\citepunct{; }%
\let\BibLabel\@empty
}{%
\let\ycite\cite \let\ocite\cite
\let\ycites\cites \let\ocites\cites
}

```

Turn off hyper stuff if the hyperref package does not seem to be loaded.

```

\AtBeginDocument{%
\ifundefined{hyper@link}{%
\let\ar@hyperlink\@firstofone
\let\hyper@anchor@thebib\@firstofone
\let\hyper@anchorstart@gobble \let\hyper@anchorend\relax
\let\BackCite\@empty
}{%
}
}

\IfOption{jpa}{%
\amsrefs@warning{The 'jpa' option is obsolete}%
\typeout{Trying \string\usepackage{amsjpa} instead ...}%
\RequirePackage{amsjpa}[2000/02/02]
}{}

```

Here ends the `amsrefs` package, unless the author-year option is in effect; then we want to use some different bibspecs.

```

\IfOption{author-year}{\endinput}
\renewcommand{\AuthorList}[1]{\PrintNames{author}{}{#1}}%

Invert the first author's name.

\BibSpec{firstauthor}{
+}{}{surname}
+{,}{ }{given}
+{,}{ }{jr}
}

```

No parens around the year.

```

\renewcommand{\PrintDate}[1]{\print@date}
\def\print@date{%
\IfEmptyBibField{date}%
{\IfEmptyBibField{year}{\BibField{status}}{\bib@year}}%
{\bib@year}%
}

\BibSpec{article}{%
+}{\PrintAuthors} {author}
+{.}{ \PrintDate} {date}
+{.}{ \textit} {title}
+{.}{ } {part}
+{,}{ } {journal}
% +{,}{ ISSN } {ISSN}
+{ } { \textbf} {volume}

```



The date form is tricky depending on presence or absence of DOI.

```

+{,}{ \PrintDOI}      {doi}
+{,}{ \eprint}        {eprint}
+{} { \parenthesize}{status}
+{,}{ \eprintpages}  {pages}
+{,}{ }               {note}
+{,}{ }               {transition}
+{} { \SentenceSpace \ReviewList}  {review}
+{}{ \parenthesize}{language}
}
\BibSpec{book}{%
+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{.}{ \PrintDate}{date}
+{.}{ \textit}{title}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ \PrintEdition}{edition}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{place}
+{,}{ \ISBNList}{isbn}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{collection.article}{%
+{}{\PrintAuthors}{author}
+{.}{ \PrintDate}{date}
+{.}{ \textit}{title}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ \PrintEdition}{edition}
+{}{ \PrintEditorsB}{editor}
+{,}{ Proc. \ }{conference}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{place}
+{,}{ \DashPages}{pages}
+{,}{ \ISBNList}{isbn}
+{}{ \parenthesize}{status}

```

```

+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{report}{%
+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{.}{ \PrintDate}{date}
+{.}{ \textit}{title}
+{,}{ }{type}
+{,}{ \EnglishInitialCaps}{booktitle}
+{,}{ Technical Report }{number}
+{,}{ }{series}
+{,}{ vol.~}{volume}
+{,}{ part~}{part}
+{,}{ }{publisher}
+{,}{ }{organization}
+{,}{ }{institution}
+{,}{ }{place}
+{,}{ \ISBNList}{isbn}
+{,}{ \eprint} {eprint}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
\BibSpec{thesis}{%
+{}{\PrintAuthors}{author}
+{}{\PrintEditorsA}{editor}
+{.}{ \PrintDate}{date}
+{.}{ \textit}{title}
+{,}{ \PrintThesisType}{type}
+{,}{ part~}{part}
+{,}{ }{organization}
+{,}{ }{institution}
+{,}{ }{place}
+{}{ \parenthesize}{status}
+{,}{ }{note}
+{.}{ }{transition}
+{}{\SentenceSpace \ReviewList}{review}
+{}{ \parenthesize}{language}
}
</pkg>

```

The usual `\endinput` to ensure that random garbage at the end of the file doesn't get copied by `docstrip`.

```
\endinput
```

**References**

- [1] Pedro J. Aphalo, *A proposal for citation commands in L<sup>A</sup>T<sub>E</sub>X<sub>3</sub>*, TUGboat **18** (December 1997), 297–302.
- [2] Nelson Beebe, `xbtxbst.doc`, software documentation for extended bst files.
- [3] *Chicago Manual of Style*, 13th ed., University of Chicago Press, 1982.
- [4] Dana Jacobsen, `bp`, a *Perl Bibliography Package*, December 19, 1996, version 0.2.97 beta.
- [5] Michael Piotrowski, Jens Klöcker, and Jörg Knappen, *Is L<sup>A</sup>T<sub>E</sub>X<sub>2</sub> $\epsilon$  markup sufficient for scientific articles?*.