Theorem 2. Let \( U \) a balanced open subset of a Fréchet space \( E \), then \( G(U) \) is quasinormable if and only if \( E \) is quasinormable.

These results are part of the authors doctoral thesis under Prof. S. Dineen, which is due to be submitted to the NUI in 1992.

References


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PROPOSED SOLUTION
TO A PROBLEM OF MINIMAL DIRECTION
IN TYPESETTING

Notes for contributors

Micheál Ó Searcóid

Abstract: This is a first attempt to present to contributors of the Bulletin a plain \TeX\ package which will allow them to do most of their own editing and to present papers in a form more or less ready for publication. The article also describes how to use MISTRESS, a system for typesetting references in many journals with different styles.

Introduction

The Bulletin has been beset by production problems over the last couple of years. Rex Dark and I, as acting editor and production manager, decided that we should make a concerted effort to tackle these problems in a way which would both enable us to get the Bulletin back on schedule by early 1993 and make it easier for future editors to get issues out on time. In this article, I should like firstly to make some observations and suggestions to the mutual benefit, I hope, both of the production team of the Bulletin and of its contributors. Secondly, I will describe the solution to the problems which arose from those observations.

Submissions to the Bulletin

It was decided at a recent meeting of the IMS that contributors should be encouraged to submit articles in \TeX\ if they have the facilities to do so. Since our typesetting is done in \TeX, it is reasonable to suppose that \TeX-written papers will be processed more quickly than those that are not so written; indeed some journals
now quantify the extra time that non-TEX authors are likely to have to wait to see their work in print. It appears, however, that this is no longer the most important consideration for speedy production of the Bulletin.

Judging by the material in the 1991 issues and by that which remains in the editor’s file, it is evident that most of our contributions are now presented in TEX. Of all this material however, only one review looked as it came from the author even remotely like the finished product in print. We have plain TEX, LATEX and \texttt{AMS-TEX}, each used with a multitude of different styles, magnifications and fonts, and each in a format pleasing, no doubt, to the eye of the author. Nonetheless, an editor must impose some degree of uniformity on the works he is going to print. Here then is the nub of the problem: most of us are now typesetting our own material, but the IMS has not yet got round to telling us, even in broad terms, how it wants it to be done.

What guidelines should there be for the typesetter? There is one obvious physical limitation: a paper typeset in non-magnified fonts on A4 paper can hardly be squeezed onto A5 and remain easily readable. There are other limitations demanded by good taste: that headlines, numbering and title fonts be consistent; that page dimensions be consistent; and that references be made in a standard journal style. Information regarding these and similar details, if made available to the contributor, would enable him to decide how his long equations would be broken, where his pagebreaks would occur, and generally what the final version of his paper would look like in print. In short it would increase and not decrease his freedom and independence.

Moreover, since contributors have, for the most part, already acceded to the express wish of the Society that articles be submitted in TEX, there is every reason to suppose that, if presented with a basic format file and instructions on how to use it, they would be willing, and indeed find it to their own advantage, to employ such a file in preparing their documents. For better or worse, we mathematicians are now our own typesetters, and we want to be able to present copy which needs little or no editing.

It seems, therefore, that any long term solution to our prob-
% \imssubtitle Notes for contributors
%
\imsshorttitle{Direction in Typesetting}
%
\imsaddress
M'\'iche\'al \'O\"Searc\'oid,
Roinn na Matamaitice,
Col\'aiste na hOllscoile,
Baile \'Atha Cliath.
%
\imsabstract{This is a first attempt ... styles.}
%
\imsstart

Here is the information needed for using the header macros:

1. At the head of the document the file imsform.tex should be input. If references are to be included, then the file mistress.tex should also be input.

2. Each of the control sequences \imsitle, \imsauthor, \imssubtitle, \imsaddress, together with two others not used in this article, \imssovertile and \imsrevinfo, must, if used, appear alone on a line, should be followed by lines of text which are to appear in the output on distinct lines and should be followed by a blank line. Lines of output will be centred automatically, with the exception of those that go with \imsaddress.

3. In expanding any of the macros mentioned above, \TeX will use the end of line marker as a parameter terminator. A comment marker % on any of these lines of text would prevent \TeX from seeing such a marker. It follows that comments should not be made between the initial control sequence and the terminating blank line when any of these macros is being used.

4. All lines of text associated with these macros should normally be written in lower case, except for those belonging with \imsitle.

5. In general a contributor should allow \imsform to decide which fonts are going to be used in the heading.

6. Sometimes an extra heading will be necessary above the title. It is for typesetting such a heading that the control sequence \imssovertile is intended. Note its use for the heading Book Review in this issue of the Bulletin. Since such overtitles are typeset in the mandatory white space which always appears above the title of an article, they do not take up any extra space. Their insertion or removal by the editor will not therefore affect page breaks.

7. The control sequence \imsrevinfo is intended for book reviews. The information given here might include the name of the publisher, the place of publication, the price, the number of pages, or other relevant data in accordance with the wishes of the editor. The reviewer has the opportunity to determine how this information should be split into lines, bearing in mind that these lines will be centred on the page.

8. In the case of multiple authorship, the names of all authors should appear in a single use of the macro \imsauthor. The various names will be distributed onto separate lines exactly as is done in the input file.

9. Different addresses should be entered separately. So, if two or more authors have separate addresses, the macro \imsaddress should be used once for each address. The names of the authors should be included in the address. A roman typeface will be used automatically for the addresses, and they will be typeset at the end of the paper. Actually it is the incidence of multiple authorship which makes it desirable to have a macro of this sort, because in that case one wants, if possible, to have some addresses left justified and others right justified. The macro \imsaddress decides whether or not the lines of the addresses are too long for this and, if not, arranges pairs of addresses to hang from the same horizontal line.

10. The other header macros are \imsreviewer, \imsabstract, \imsshorttitle and \imsinfo. Each of these should be fol-
lowed by a single parameter enclosed in braces.

11. An example of the use of \imsabstract is given above. The use of \imsinfo is identical. The difference in output between these two macros is that the former will typeset the word Abstract before the text whereas the latter will not. The macro \imsinfo has been used in issue 26 and in this issue in the abstracts of doctoral theses. Note that abstracts appear in nine point type. The reason for this is simply to allow them to match any references, which for technical reasons appear in the smaller type.

12. The control sequence \imsreviewer should be used in book reviews and should be followed by the name of the reviewer flanked by braces. In the output, the reviewer's name will be automatically preceded by the words 'Reviewed by'.

13. The control sequence \imsshorttitle should be followed by the headline which is to appear at the top of pages. This must not be wider than about three quarters of the length of a line of text in the Bulletin. The short title will appear in a slanted typeface at the head of every odd-numbered page which is not also the first page of the article. Even-numbered pages will show the name and issue of the Bulletin. In the proof copy this will read IMS Bulletin 00, 1978, but that will be corrected by the editorial staff at the time of publication.

14. When all header macros have been used, the control sequence \imsstart should be written and the body of the article begun. This macro typesets the header with all the desired spacings and leaves \TeX{} in horizontal mode, suppressing indentation of the subsequent text.

15. No font changes or vertical skips should be introduced before, during or after use of the heading macros; those required by the editor have been built into the macro \imsstart.

General layout

Let us accept as a premise that most mathematicians are reasonably competent typesetters. This may not be entirely true, but it is not unlikely that many are at least as competent as the layout editor. It seems best, therefore, at this stage, to present only a few general guidelines as to how a paper should be typeset.

1. Authors are reminded that indentation of paragraphs in English language typesetting never applies to the first paragraph of a book or paper. Plain \TeX{} does not automatically suppress that indentation, but the IMS macro \imsstart always leads into a new paragraph and always suppresses indentation of the following text.

2. Next, if the paper falls naturally into sections, as this article does, then the author is asked to use the plain \TeX{} macro \beginssection described on page 340 of the \TeX{}book. Note that the section heading following the control sequence \beginssection must always be followed by a blank line; moreover indentation of the succeeding paragraph is always inhibited. The heading is automatically set in bold type. This section, for example, was begun with
\beginssection General layout

Let us accept...

Knuth arranges for \TeX{} to find out if there is very much of the page left before beginning to typeset a new section; if there is not, \TeX{} will move on to a new page. I have changed Knuth’s settings, so that a new page will be started only if there is very little room left on the present page.

3. For theorems, lemmas etc., contributors are asked to make use of the plain \TeX{} macro \proclaim which is described on page 340 of the \TeX{}book. \imsform provides macros \imsproof and \imsendproof. The former does a small vertical skip, starts a new paragraph without indentation, writes Proof: and leaves a \quad of space before the text which follows. The latter places a small square box at the right end of the current line (or at the right end of the next line if there is no room there) and creates a medium sized vertical skip.

4. For the sets of natural numbers, rational numbers, real numbers, complex numbers and so on, authors are asked to use
bold face upper case letters (N, Q, R, C etc.).

5. The package \texttt{imsform.tex} contains a macro \texttt{ninepoint} which makes all the changes necessary for typesetting both text and mathematics in the smaller point size. The meanings of control sequences such as \texttt{rm, tt, sl, it} etc. are all altered, as are all the spaces used in typesetting. The \texttt{ninepoint} macro should be used sparingly for displayed material. \texttt{imsform.tex} contains also a \texttt{tenpoint} macro.

6. Articles should end with \texttt{bye}, not with \texttt{end. imsform.tex} has redefined plain \TeX's macro \texttt{bye} so that it performs as usual when typesetting a single file, but behaves like \texttt{endinput} when the editor typesets a complete issue.

7. At the end of the paper, before saying \texttt{bye}, the contributor should type \texttt{imsclose}. This macro will typeset the addresses previously given; it will also activate the \texttt{MISTRESS} control sequence \texttt{References} if \texttt{mistress.tex} has been input. All spacing is automatic.

8. Authors should be careful about the use of private macros. Since a whole issue of the Bulletin will be typeset eventually from a single input file, macros defined in one article may affect the typesetting of another. Private macros must not interfere with public ones. In particular, authors should not use control sequences which override similar ones defined in plain \TeX. Since IMS macros normally begin with \texttt{ims}, it is easy to avoid confusion with them. Also, since \texttt{MISTRESS} macros begin with upper case letters, it is best to reserve such control sequences for references, as described later in this article. It should also be noted that certain combinations of characters signal ligatures to the CM fonts, so should be avoided; for example, \texttt{\{} should not be used as a macro name.

9. When the editor processes the main file for a complete issue of the Bulletin, the list of contents will be automatically typeset. An author can specify a contents entry by using \texttt{imscontadd} somewhere in his file. The entry for this article was

\texttt{\textbackslash{imscontadd}{Proposed Solution to a Problem of Minimal Direction in Typesetting}\textbackslash{i che}\textbackslash{'al \textbackslash{'O'Searc}\textbackslash{oid}\textbackslash{imspageno}}%}

The title comes first; if it is too long for a line, \texttt{imsform} will split it. It will not do the same for the author or authors, which come next after a single ampersand. Where there is more than one author, it might be desirable to typeset the names on separate lines; this can be done by enclosing the authors' names in braces and separating them by ampersands, e.g. \texttt{\{J. Smith\& W. Berry\}}. The names should be followed by an ampersand and the control sequence \texttt{imspageno}.

### Typesetting diagrams

A few points should be remembered when introducing diagrams into a paper:

1. The Bulletin is published in a rather small format which means that diagrams should in general be somewhat smaller than they might be in some other journals.

2. Diagrams usually consist of big chunks of typescript. It may often be necessary to juggle around a little with the raw text of a document so that each diagram is typeset not only at a relevant point in the article but also at a suitable point on a page to avoid vertical overflow.

3. If an author has used the \texttt{GRAPPAK} to create diagrams for a Bulletin article, it may be well to remember that although diagrams are typeset

This diagram was typeset using the command \texttt{Diagram}; the text you are reading followed, in braces. The exact position of the whole picture was arranged by inspection.
simply by writing `\diagram1, \diagram2` etc., there is provision in \textit{THE GRAFPAK} for the author to vary the amount of space automatically inserted above and below diagrams and also that space between the diagram and any legend which might accompany it.

4. If diagrams created by \textit{THE GRAFPAK} are to be typeset, the author should submit, with the \TeX source file for his article, the \texttt{METAFONT} and \TeX files written by \textit{THE GRAFPAK} which form the source files for his diagrams.

\section*{Typesetting references}

It is characteristic of the pure mathematician to seek general solutions to particular problems. It was not my job to decide on a format for references in the Bulletin; rather I have followed what, in general, the editors have been doing, not without some loss of consistency, in recent issues. It was somewhat harder to decide how to make it easy (the emphasis must be on ease) for an author to conform to such a style. Moreover, references are things which may be used several times in several different publications, whose editors may and do demand that their own particular styles be adhered to. Styles differ considerably, yet we should like to be able to lift a reference directly from one paper for use in another. In any case, it is probably true that more typing errors are made and overlooked in reference lists than anywhere else in a paper; any automated system to ensure correct syntax and punctuation is surely worth having. Yet plain \TeX makes no particular provision for typesetting references, nor was there ready available any macro package to assist us in doing it. So the general solution which arose from the particular problem of typesetting reference lists for the IMS Bulletin is \textit{MISTRESS}: Macros of an Intelligent System for the Typesetting of References in accordance with External Specifications of Syntax.

\section*{Introducing \textit{MISTRESS}}

Where references are to appear at the end of a document, the invocation `\input mistress` should appear somewhere near the beginning of the file. The references themselves should be contained in a separate file whose name is the same as the name of the \TeX source file of the document, but with `.ref` as extension.

The references should be written in a standard format explained below; references written in this format can subsequently be typeset for another journal provided you have a syntax file for that journal (fortunately these are not too difficult to write, as will be explained later).

In fact \textit{MISTRESS} is empowered to instruct \TeX to write the reference file for any particular document, provided the references needed are already contained in other master reference files. The format of any particular reference in a master file and its copy in the specific file for a document are identical. For the moment, therefore, we shall suppose that the `.ref` file for our document has been written. In the next section, we shall explain how to tell \TeX to write it.

The reference file for the present article is as follows:

\begin{verbatim}
\Syntax {original}
\Newref CAR87a
Carroll*
\Names M. M. Carroll
\Status in press
\Article Exact solutions in compressible isotropic ¾ elasticity
\Editor M. M. Carroll
\Inbook Nonlinear effects in solids and fluids
\Addtitle Proceedings of symposium in honour of ¾
R. S. Rivlin, Boston, Dec. -1987
\Endref
\Newref COX89a
Cox \& Mortell*1989
\Names E. A. Cox* M. P. Mortell
\Article The evolution of resonant acoustic ¾ oscillations with damping
\Inbook Elastic wave propagation
\Frompage 173
\Topage 8
\end{verbatim}
treated in exactly the same manner; only the nature of the information required changes.

5. Each item has a MISTRESS classification code. This should appear on the same line as the `Newref` command, separated from that command by a space. Ideally every document should have its own distinctive classification code. The MISTRESS classification system allows for this. The first part of the classification code normally consists of what is called the `Nickname`; the `Nickname` is a sequence of letters of the alphabet, the first and last of which must be upper case; they would normally be the first three letters of the author's surname (I used MUR for [3]). Where there is any possibility of the complete classification code for two documents being identical, MISTRESS allows that this first part be enhanced by placing any number of lower case letters before the `Nickname`; one possibility is to use initials for these lower case letters. This does not alter the `Nickname`. The second part of the classification code consists of three symbols; the first two form what is called the `Shortyear` — they will usually be the last two digits of the year of publication (use 00 for 1900 or 2000; use 01 for 1901, etc.), but if this is not appropriate two digits must appear anyway. The third character must be a letter; usually this will be lower case, but upper case can be used as well. In this way 52 different items can be classified as belonging to the same `Nickname` and `Shortyear` before it becomes necessary to add leading lower case letters to the classification codes. The MISTRESS classification code I used for Murphy's work is MUR90a.

6. On the line following Newref, there should appear what is called the `Shortname`, then a single asterisk, then the `Fullyear` followed by termination of the line. Note that in the first of our references `Fullyear` was left empty, pending publication — hence the asterisk was the last character on the line. `Shortname` and `Fullyear` may be used by a syntax file either to refer to articles in the body of a document or to label them in the list at the end of the work. Their use
7. It is important that the classification code be reasonably easy to remember, because it is used to refer to articles in the body of a document. When I want to cite Murphy's book on $C^\ast$-algebras, for example, I type $\backslash$MUR90a*. An optional parameter may appear between the classification code and the asterisk.

8. The expansion of the command $\backslash$MUR90a* will depend both on the syntax file in use and on the document being written. Had I wanted to refer to Murphy's section on the three fundamental results in K-theory I should have typed $\backslash$MUR90a, pages 229-40*. The output would be: [3, pages 229-40]. The syntax file which decides this output for the IMS is original.syn. In that file, one finds the line $\backslash$CALLREF{[Refcount\Parameter]}% which explains the output. Note that the counter $\backslash$Refcount is document dependent, since it refers to the position occupied by the article in the current list of references.

A different syntax file might use one or more of the macros $\backslash$Refcount, $\backslash$Shortname, $\backslash$Shortyear, $\backslash$Fullyear or $\backslash$Nickname, or even a document dependent lower case letter accessed by $\backslash$Shortchar. To explain this last macro, suppose that the list of references for an article contained three different works by Murphy dated 1990. Their classification codes might be MUR90c, MUR90f and MUR90g, say, in that order. Clearly the letters c, f and g, though used to cite the articles, would be meaningless for output in the context of the article. What $\backslash$Shortchar does is to convert these letters into document dependent letters for the purposes of output. The $\backslash$Shortchar for the three 1990 articles of Murphy would be a, b, and c respectively. If the syntax file in use specified $\backslash$CALLREF{[Nickname\Shortname\Shortyear\Shortchar\Parameter]} then the expansion of, say, $\backslash$MUR90f, page 22* would be [MUR90fb, page 22].

9. Note that $\backslash$MUR90a is not a control sequence; The control sequence is $\backslash$MUR and the 90a occur as parameters. It is necessary to mention this, because if the user is in the habit of creating short private macros whose names use upper case letters, he may encounter conflict. When using MISTRESS it is advisable to reserve upper case letters for reference use alone.

10. Every other item between $\backslash$Newref and Endref starts with a control sequence and ends with a line break. The line break is being use as terminator for parameters; if it is desired to go onto a new line in the input file before the end of the parameter, then the comment marker (%) should be used to prevent TeX from seeing the end of the line.

11. Here is a list of the control sequences available:

<table>
<thead>
<tr>
<th>Names</th>
<th>Editor</th>
<th>Book</th>
<th>Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article</td>
<td>Journal</td>
<td>Volume</td>
<td>Year</td>
</tr>
<tr>
<td>Publisher</td>
<td>Place</td>
<td>Frompage</td>
<td>Topage</td>
</tr>
<tr>
<td>Inbook</td>
<td>Status</td>
<td>Addtonames</td>
<td>Addtotitle</td>
</tr>
<tr>
<td>Addtoeditor</td>
<td>Addtovolume</td>
<td>Addtoall</td>
<td></td>
</tr>
</tbody>
</table>

Any of the control sequences above which is applicable to the reference of a particular work may be used. The control sequences may occur in any order, with the single exception that $\backslash$Frompage should appear somewhere before $\backslash$Topage; a single page may be denoted by $\backslash$Frompage alone.

12. Note the inclusion of $\backslash$Year in the list above. In fact, it is not necessary to use it provided $\backslash$Fullyear has been specified, since the two will normally be the same. If $\backslash$Year is used, its specification will supersede that which $\backslash$Fullyear would have given to it. Note that the $\backslash$Year will always be typeset using $\backslash$Yearfont, whereas the syntax file may specify a different font for any particular use of $\backslash$Fullyear.

13. What should follow each of the control sequences can usually be inferred from the name. A few words must be said, however, about punctuation. The standard rule is that end-of-line punctuation should be omitted; the punctuation for the journal in question (in this case the IMS Bulletin) will be inserted automatically by a syntax file. In the case of journal names it is customary to abbreviate; if the last word of the journal name is shortened, the terminating full stop should be included. Note the line
14. Tying together abbreviated words in journal names with a
tilde can cause a difficulty in typesetting. In the case of sur-
names which consist of more than one word, it is essential
to do so (note \O\Search\oid in [4]). The reason for
this is that some journals enter surnames before first names.
MISTRESS will automatically reverse names if the journal
style demands it, but must have some way of deciding what
the surname actually is. It is defined to be the last con-
tinuous stream of tokens after the last space in the whole
name. This leads to two other rules: names must always be
entered with surname last; and surnames must be separated
from first names or initials by a space. It also leads to the
observation that \TeX{}-induced spaces in surnames must be
suppressed; thus the surname Maol Mhichil, which might or-
dinarily be typed \texttt{Maol\,Mhichil} must in this context be
typed without the space after \texttt{i} (which removes the dot from
the letter i). A satisfactory solution is \texttt{Maol\,Mhichil\{\textbackslash i\}1}.

15. Where there are multiple authors or editors, they should be
separated from one another not by standard punctuation but
by a single asterisk.

16. The control sequence \NAME{} refers to the headname or head-
names in the reference, whether they denote authors, editors
or translators.

17. The control sequence \EDITOR refers only to the editor or
editors of the book in which the article in question is printed.
This control sequence is not used, therefore, if the reference is
to a complete book. Note that in [1] the author of the article,
referred to using \NAME{}, is the same as the editor, referred
to using \EDITOR. Multiple editors are treated in exactly the
same way as multiple names.

18. When the syntax file original.syn is in use, the abbrevia-
tion (ed.) or (eds) (depending on multiplicity) will always
be typeset automatically after the \EDITOR.

19. Parentheses should not be put around the edition, year or
volume or any other complete item of the description. If
these are required by the journal, they will be inserted auto-
matically by the syntax file.

20. The control sequence \STATUS may be used to indicate that
a work is 'to appear', or is in 'preprint' form, or whatever
other description of that type is applicable. If the same work
is to be referenced in journals of different languages, the \TeX{}
command \LANGUAGE{} can be used to access various versions.

21. The control sequence \INBOOK is used rather than \BOOK if
the work being referred to is not the book but some article
contained in it.

22. The five \ADDTO control sequences are included because it is
sometimes necessary to give extra description of some part of
a reference. Often this is typeset using a different font. For
example a volume number may well not be sufficient, and a
journal which demands a bold face 85 may well insist that
it be followed by a roman (2). This would be dealt with by
typing \ADDTOVOLUME\texttt{2} somewhere in the description.

23. The control sequence \ADDTOAUTHORS always adds to \NAME
and never to \EDITOR. If any addition to \EDITOR is needed
then the control sequence \ADDTOEDITOR can be used.

24. The control sequence \ADDTOTITLE similarly adds to \BOOK
or to \INBOOK, or, if no book is involved, to \ARTICLE. One
obvious use of this is in the case of conference proceedings
such as [1].

25. The text belonging to the control sequence \ADDTOALL is al-
ways typeset after everything else.

26. There is no necessity to complete a .ref file before start-
ing an article; indeed it is highly unlikely that many authors
would do so. MISTRESS allows dummy references to be
collected in the main file as it is being written by using the
control sequence \REFTEMP. Here is how \REFTEMP should be
used: Suppose I had an empty .ref file when I was typing
this article; then sometime after typing \INPUT \MISTRESS, I
should have written (not necessarily all at once)
\reftemp \SIS89a \MUR90a \COX89a \CAB87a \***
(Note that the sequence of classification codes is terminated
by *** followed by a line break.)
After the above use of \ Reftemp I could use control sequences as described above to refer to [4], [3], [2] and [1] respectively in the body of my article, just as if entries for these articles were already present in my .ref file. These new entries are not in alphabetical order, so the numbers typeset by TeX would not be as they are in the final version, but at least TeX would not reprimand me for using an undefined control sequence and I would be able to get some idea of the general layout of the article without leaving spaces to be filled in later. If TeX is asked to typeset the list of references at the end of the paper, it will have a dummy entry corresponding to each article mentioned by \RefTemp, just as a reminder to the author that some references have not yet been properly defined. When ready to do so, the author can arrange the authors alphabetically and make sure that his .ref file contains the relevant entries. Then the \RefTemp command can be deleted from the file.

27. At the end of an IMS Bulletin document, the references and addresses are typeset using the single control sequence \imscl. The heading and all spacing are included in this macro. In general the MISTRESS control sequence \References would be used to typeset references alone, but it is included as part of the \imscl macro.

28. The default heading given in original.syn, the syntax file for the Bulletin, for a list of references is References; this is automatically changed to Reference if there is only one item. If a list is better described as a Bibliography or as something else, then the heading can be altered by typing \def \Refheadtext{Bibliography} or whatever else is appropriate somewhere in between \input mistress and \References.

29. The maximum number of references that can be dealt with by MISTRESS is large, and obviously will depend on how many other macro packages are being used. This article uses quite an extensive package from the GRAPPAK as well as the MISTRESS macros. I typeset it with a list of 640 references as a test, and there was plenty of memory left from a standard version of shtex. It should be said, however, that the MISTRESS system is deliberately not the most efficient it is possible to build, because the emphasis has been on adaptability and ease of use. Consequently each reference may construct from one to three macros simply so that the user can recall it in the body of an article. After a few hundred such assignments memory allocations could become scarce if TeX is dealing with a lot of other input data. One way of saving both time and a large amount of memory has been built in by allowing the user to specify that he does not want to refer to any work in the list. In long lists such as bibliographies, this may well be the case. To by-pass the calling mechanism, the user should type \let \Refcalling \relax before writing \input mistress near the head of the file.

Please do not use this by-pass in articles for the Bulletin.

Letting MISTRESS write your files

Most of us use TeX only for typesetting, but this marvellous system of Knuth's is capable of doing many other things for which we might normally use one of the standard multi-purpose programming languages. Reading and writing of files is one such function.

No user interface has yet been given to MISTRESS for the automatic writing of reference lists in the manner prescribed above; perhaps that will be included in the next version — it could even be done entirely in TeX. However, MISTRESS will instruct TeX to do something which is perhaps more complicated (in TeX terms), namely to pull out of several master reference files all the references needed for a particular article and write them into a special .ref file to go with that article. This is done by using the control sequence \Refswanted. Near the top of this file, for example, after \input mistress there is the following command: \Refswanted **{original} *{c} COX89a CAR87a *{m} MUR90a *{c} OSE89a ***

By way of explanation:

1. Each of the references is specified by its classification code (flanked by spaces), exactly as it would have been when using \RefTemp.
2. Immediately after the \Refswanted command there must be a space and two asterisks. These are followed immediately by the name of the syntax file, without the .syn extension, flanked in curly brackets and followed by a space.

3. Then a single asterisk precedes the name of the master reference file (in curly brackets) from which the next batch of references are to be read. The extension must be .ref and must not be written here. In this case the file is c.ref and in it I keep all references to articles whose first named author has surname beginning with the letter C. Note that later on the command \*{m} occurs, telling \TeX{} to read instead from the file m.ref; later on again, \TeX{} is told to move to o.ref.

4. After the master file has been specified, there comes a list of the classification codes of all articles whose reference structure is to be pulled out of that file. These can be in any order; the order of typesetting will be determined by the order in which they occur in the master file.

5. The whole is completed by typing *** followed by a line break.

6. Note that the master files are listed alphabetically, so that Cox and Carroll (not in that order) will be listed before Murphy, and Murphy before O'Searcoid.

7. \TeX{} will be informed by MISTRESS how many references are to be pulled out of any given master file. The procedure followed then is that \TeX{} will start reading that file; every time \TeX{} sees \Neuref, it will look at the classification code which follows. If it recognizes it as being wanted, \TeX{} will read on to Endref and will copy out the whole of the reference into the new file. If \TeX{} sees that the particular reference is not one of those wanted, it will ignore most of the text down to the next Endref (to be precise, \TeX{} will at this stage be interpreting the backslash as a comment character; since most lines of a MISTRESS reference begin with a backslash, this means that \TeX{} will not even read them). \TeX{} will carry on in this way until it has got hold of the number of references asked for by MISTRESS. It will then stop reading and immediately close up the master file.

8. It is still the practice of some journals to list references at the end of an article in the order in which they were cited, rather than in alphabetical order. This can be handled by MISTRESS, though more time is involved, by making sure that each classification code in the list of \Refswanted is preceded by an indication of which reference file it should be taken from. This practice ensures that the order exhibited in the \Refswanted list is the same as the order in the \TeX{}-written .ref file. For this paper I should have typed

```
\Refswanted *{original} *{o} OSE89a
*{m} MUR89a *{c} COX89a *{c} CAR87a ***
```

Note that \TeX{} knows when there is only one item to be located in any given master file and will not read beyond it. It is wise, however, to make sure that master files do not contain an unwieldy number of references.

9. On \TeX{}'s first run, a file whose name is identical to that of the main file, but whose extension is .ref will be written according to the specifications given by \Refswanted, provided no such file exists. If such a file exists, as it will do on subsequent runs, the command \Refswanted will either be ignored or will be used only to get information from the .ref file. All the information between the control sequence and the terminating three asterisks will be skipped over.

10. One may use \Reftemp in conjunction with \Refswanted, but note that numbering may be temporarily upset by \Reftemp.

11. \Refswanted should not be deleted after it has been used. When the final version of the paper is being written, new items which had been only temporarily listed with \Reftemp can be added to their correct master files, and their classification codes transferred from \Reftemp to \Refswanted. Then, if the .ref file specific to the document is erased, a further run of \TeX{} will rewrite it with all the new items included.

**Arrangement of master files**

On referring to an article or book for the very first time, one writes the standard MISTRESS reference entry for that work; one then presumably tests it to make sure that no mistakes have
been made. The reference may be required again at some future
date, so it should be filed away in some master file of references. It
makes sense that it should go into its correct alphabetical position
in that master file. Over the years, however, one’s catalogue of
references is liable to increase substantially and it is reasonable
that several such master files should be kept. This is advisable
also in view of the fact that the amount of reading which TEx has
to do will, in the long term, be less if the complete library of
references is split up. So a classification problem arises.

Retrieval and copying must be the key elements in the ar-
range ment of master files. Each master file should certainly be
arranged alphabetically, but one must still decide which master
file any particular reference should go into. It is worth while keep-
ing the following points in mind:

1. If partitioning by subject or by some similar criterion is re-
quired, it would be well to make sure that this is not so de-
tailed as to separate into different categories any two articles
which may be referred to in the same document. It would be
unwise, for example to have one set of master files for Func-
tional Analysis and another for Operator Theory, since that
would create minor difficulties in ensuring that the .ref file
for any document which referred to articles in both these cat-
egories would itself be automatically alphabetically ordered.
Having separate categories for Celtic Studies and Numismatics
might however be permissible.

2. The lowest level of file arrangement should be alphabetic.
Suppose there is a category of master files for Pure Math-
ematics. There could be a great many articles cited in these
master files, but it is perhaps best that they be separated
alphabetically. One file may contain the works of authors
whose surnames begin with A, B or C, say, and the next
those whose names begin with D or E, and so on. If this is
done then any list of references which cites only articles in
Pure Mathematics can be arranged automatically in alpha-
betical order without TEx having to look at any master file
more than once.

Syntax files

MISTRESS cannot operate without a syntax file. When a syn-
tax file is specified by \refswanted then the line
\Syntax {<filename without extension>}
will appear at the head of the .ref file that TEx writes for the
document. If the user writes his own .ref file then he must write
in a similar way the name of the .syn file (without the extension
.syn which will be assumed) which MISTRESS should call up.

Syntax files contain information about the different fonts to
be used at different parts of a citation, about the punctuation to
be used, about the mode of reference to be adopted in the body of
an article, about the labelling of references in the list at the end of
an article and about one or two other minor details. It is hoped to
develop a library of syntax files for different journal styles; these
can never of course be authoritative without the approval of the
editorial staff of a journal. If care is taken, however, to copy
exactly the style actually in use by that journal, there is every
reason to suppose that the output will be acceptable.

Here is the text of the original .syn file which we shall use
as an example.

\REFHeading\centerline{bf\Refheadtext}\smallskip
\Pointsize\Set\emergencystretch=13pt\%
\def\RefHeadText{\ifnum\RefCount>1 References\else
Reference\fi}\%
\RefIndication{\bbox to -7pt{\hspace{\RefCount}}\kern7pt}%%
\Call\Ref{\RefCount}\Parameter\%
\def\Internames{, }%
\def\And{\ and}%
\%
\IfInJournal
\NAMES
\ADDTONAMES
\TITLE
\JOURNAL{}
\VOLUME
\ADDTOVOLUME
\YEAR
% The various parts of this file are explained below:
1. The first item tells us that the reference list should be headed
   by whatever is contained in the macro \Refheadtext; that
   this should be printed in bold face in the centre of a line,
   and that it should be followed by a small vertical skip. The
   control sequence \Pointsize is set to \relax (i.e. do noth-
   ing) by MISTRESS unless it has previously been defined.
   In fact, if one is writing for the IMS and imsform was input
   before mistress, then \Pointsize will have been defined
   to be \ninepoint. This means that the reference list will
   be written using fonts of nine point size and with appropri-
   ate spacing. This decreases the likelihood of overfull hboxes
   which is bound to be a difficulty when dealing with a rather
   narrow page.

   The \Setfonts control sequence sets all the fonts neces-
   sary for different parts of each citation. It will be explained
   further on.

   The use of \emergencystretch needs some explanation.
   It may not be familiar to some users of \TeX{} since it did not
   exist before \TeX{}X. \TeX{}X does not in general allow too much
   freedom in word spacing because it wants the output to look
   as good as is possible; it hyphenates, if that is allowed by
   its hyphenation table, rather than allow too much ugly white
   space to appear on a line. It does happen, however, particu-
   larly when the line width is narrow, that \TeX{} is incapable of
   either hyphenating correctly or spacing according to the rules
   laid down; in such cases we are likely to encounter underfull
   and overfull hboxes. One partial solution to this is \h fuzz
which allows text to stick out beyond the end of a line, but this can look ugly even if the jut out is only two or three pixels. The new macro \emergencystretch allows \TeX to insert more white space in cases where no other solution is possible. It is used in the reference section of this package to try to ensure that the user never need tamper with the text of references in order to avoid \hbox difficulties.

If you are using any version of \TeX prior to \TeX3 you should get hold of the most up to date version and destroy your earlier one. In case any of our readers is unaware of the fact, s\TeX is a fast, efficient and compact version of \TeX for the PC; it is one of the few versions which is kept completely up to date by its author, Wayne Sullivan of the UCD Mathematics department, and it is available free of charge.

2. The second item tells \TeX what the \Refheadtext should normally be, namely the word References unless the number of references (recorded by \Refcount, which at this stage of the operation will return the full number of references) is 1, in which case the singular version is used. If alteration is required, this should be done in the main document as was described in an earlier section.

3. Next \REFinicator tells \TeX both how to label references in the list and where to put the label. In the original syntax file the indicator is the number of the reference, accumulated by \Refcount, inside square brackets. It is placed in the left hand margin with its right edge a distance of Tpt from the start of the text. Other possibilities for \REFinicator might include the use of \Shortname, \Shortyear, \Shortchar, \Fullyear, or \Nickname as well as or instead of \Refcount. Note that this makes the popular Harvard style possible.

4. Then \CALLref tells \TeX how citations in the body of an article should be made. This syntax file says that a citation should consist of the number of the reference followed by any parameter included in the text of the document (the termination of which is indicated there by an asterisk), the whole enclosed in square brackets. It has been explained in the last section how a syntax file can be set up to produce quite different citations.

5. \INTERNAMES tells \TeX what punctuation to use in between names of multiple authors or editors; \And takes the place of \INTERNAMES before the last name in such a sequence.

6. Next come three sequences which describe how the three different types of reference should be typeset. These begin with the control sequences \IFINJOURNAL, \IFBOOK and \IFINBOOK respectively, each written on a line by itself. Each is terminated by a three consecutive asterisks on a line by themselves. In between the control sequence and the three stars there are several lines of instruction. These lines must all conform to a single pattern. They begin with some sequence of text (usually punctuation) terminated by a star. A single control sequence follows. After that there is more text terminated by a line break. Either or both of the two sequences of text may be empty. The rule that \MISTRESS tells \TeX to follow is this: if the control sequence has been set to \relax then the whole line is ignored. Otherwise the macro will be expanded and the whole line will be typeset. Each of the control sequences involved here is initially set to \relax for each work listed; that is changed only if their is an appropriate entry in the .ref file for that work; for example \Names will change the relaxed status of \NAMEs and will decide what text forms the expansion of \NAMEs; \Book or \Inbook or \Article decides what goes into \TITLE, \Publisher decides what goes into \PUBLISHER, \Frompage and \Topage decide what goes into \PAGE and so on. Note that a trailing space should be made explicit before the line break or it may not be noticed. This was done after \JOURNAL above.

Also, if one wants to insist that certain punctuation be typeset independently of the expansion of any \MISTRESS macro then the \TeX control sequence \empty can be used since it is never equivalent to \relax, but it expands to nothing (it is used above in original.syn).

7. Note that \Names are automatically counted by \Plural, so that it can be specified in the syntax file how multiple authors might be dealt with differently from single ones. \Plural is
reset to 0 by \Editor and the names for this command are similarly counted. original makes use of \Plural to specify that an editor is denoted by (ed) but that multiple editors are denoted by (eds).

8. All fonts for citations must be specified in the definition of \Setfonts in the syntax file. These are the fonts:
\Namesfont \Editorfont \Bookfont
\Inbookfont \Journalfont \Yearfont
\Publisherfont \Placefont \Pagenumberfont
\Statusfont \Addtonamesfont \Addtotitlefont
\Addtoallfont \Editionfont \Addtotitlefont
\Articlefont \Volumefont \Addtovolumefont
\Articlefont \Volumefont \Addtovolumefont

If fonts are to be non-standard, then the fonts should be initialized in the usual way. For those which are to be simply \rm, \it, \bf or \sl \MISTRESS provides a short way of setting them. For example
\Fonts\thisfont\thatfont\ttotherfont*
sets those three control sequences to be globally identical to the current meaning of \rm (in a reference list for the Bulletin, that is nine point computer modern roman). Note the asterisk which terminates the use of \Fonts.

9. Some journals insist on reversing the names of authors. The Proceedings of the Royal Irish Academy, for example, follows that practice. That journal does not, however, reverse the names of editors. \MISTRESS provides two numbers \Reversenames and \Reverseeddnames which are set to zero by default. If initials (or first names) are to appear after the surname, then either or both of these numbers should be given a positive value. Where reversal is effected, a comma will separate the surname from what follows.

10. If frenchspacing is required in the references, then this can be indicated in the syntax file by saying \Frenchspacing=1. If frenchspacing is turned on in this way for references, it will be turned off again afterwards; otherwise any frenchspacing operative independent of \MISTRESS will not be tampered with.

11. All syntax files made for public use should have the extension .syn. They should be clearly marked as being for use with \MISTRESS, and should state the name and address of the author together with the date of the last amendment.

For the purposes of comparison, the references for this paper are listed twice using the same .ref file, first with the syntax file riaproc.syn, which approximates the specifications for the Proceedings of the Royal Irish Academy in so far as that is possible on this narrow page, then with the syntax file original.syn.

Notes for editors

The editor or production manager should have, in addition to the files imsform.tex, mistress.tex and original.syn, the following four files: imslogo.tfm, imslogo.pk, imsbegintex and imsvartex.

The first two files are for printing the logo of the Society. The .tfm file should be stored in the usual place where TeX looks for such files, and the .pk file, which is for use with 300 dpi printers, should be stored where TeX looks for such files. Depending on the directory structure used on the machine, it may be necessary to change the extension of the file name from .pk to .300.

The font imslogo contains the logo of the Society in 26 different sizes; the smallest, \char1, appears on page headlines in this issue and the largest, \char26, is that appearing on the cover.

The file imsbegintex typesets the cover, inside front cover, contents page, and the pages numbered with roman numerals. It should be placed in the directory where TeX looks for input files. Changes in imsbegintex will be necessary only if the editor decides to change the format or wording of the material. Changes of fees and of officers are provided for in imsvartex.

The file imsvartex must be in the directory where typesetting of the current issue of the Bulletin is taking place. It contains all the variables for imsbegintex which change from time to time, such as names and addresses of officers and membership fees. This file should be read and kept up to date by the editor.

To typeset an issue of the Bulletin, the editor should make sure first of all that each of the files for inclusion is to his satis-
faction. He should ensure that each file contains an \imscontadd instruction for inclusion in the contents page, and that each file is terminated by \bye. He should check that the \imsshorttitle is correct for each file. Then he should collect all the files for inclusion and the input files they call on in the current directory together with the current version of imsvar.tex.

The main file should then be written. The main file for the current issue of the Bulletin is as follows:

\input imsform
\imsnumber=27
\input mistress
\imsinput minsa91
\imsinput sep91
\imscontadd{Thesis Abstracts%%}
\imsinput aisling
\imsinput susan
\imscontadd{Research Announcement%%}
\imsinput chris
\imscontadd{Directions for Contributors%%}
\imsinput ti
\imscontadd{Articles%%}
\imsinput 1891
\imsinput reid
\imscontadd{Book Review%%}
\imsinput wardrev
\imsinput imsbegin
\bye

Note the following:

1. Both imsform and mistress should be input in the main file, even though they may be input again in the individual files. At the stage of a second input, \TeX will not bother re-reading macros it has already stored.

2. \imsnumber should be set equal to the number of the issue. The month and year will be calculated automatically. If for any reason the calculation becomes incorrect, the editor should follow the instructions given in imsvar.tex for setting them right.

3. Several instances of \imscontadd occur in this file. In each of them, the entry after the second ampersand is empty. In this case, \TeX has been instructed to leave some space and typeset the title entry in bold face.

4. \imsinput is used instead of \input for each of the articles to be input. This ensures, amongst other things, that \bye will not cause \TeX to stop typesetting.

5. \bye in the main file has its usual meaning.

6. The file imsbegin is listed last, after the contents have been built up. It will arrange for the automatic typesetting of a contents page, amongst other things. There is a very slight possibility of error in the roman numerals in the list of contents which indicate the pages on which the list of officers and the notes on membership occur. If this happens, then the editor should type \imsstartpage=z where z denotes the number (as an Arabic numeral, not roman) of the page on which the list of officers is to be found.

7. The number of pages before that numbered with the arabic numeral 1 should always be even. If it is not, then an extra blank page should be inserted before sending the material to the printer. Failure to do this could result in an issue like number 25 where odd-numbered pages were on the left and even-numbered on the right.

8. When the complete issue has been typeset and printed, the editor should move to the front those pages of \imsbegin which belong there before sending the package to the printer.

Final notes

1. Wayne Sullivan has arranged for the files imsform.tex, mistress.tex, original.syn and riaproc.syn to be resident on his MATHDEF noticeboard. They can be picked up from there by sending a message to LISTSERV. On your mainframe, you should e-mail to listserv@irlearn.ucd.ie and include the following four lines as the body of the message:
get imsform.tex
get mistress.tex
get original.syn
get riaproc.syn

Note that this message is to be sent to LISTSERV, not to
MATHDEP.

2. These files are copyright and should not be altered. The
MISTRESS package is free to individual members of the
IMS, only on condition that any syntax files written by mem-
bers are sent to me for free distribution with MISTRESS.
original.syn is the syntax file for the Bulletin; riaproc.syn
attempts to imitate the syntax for the Proceedings of the
RIA.

3. The files imsform.tex, mistress.tex and all .syn should
be placed in a directory where TpX looks for input files.

4. Authors are reminded that their own private macros for a
paper should either be included in the TpX source file or, if
written in a separate input file, should accompany that file
when it is submitted to the Bulletin.

5. When a paper is written in TpX for the Bulletin, two printed
copies should be sent by mail to the editor and the TpX input
file should also be sent in the manner described on the inside
of the back cover of the most recent issue of the Bulletin.

Acknowledgement

The Mathematics department in UCD is fortunate in having its
own resident TpX wizard in Wayne Sullivan. We are also fortunate
in that he is usually willing to drop what he is doing and help solve
other people's problems on the spot. I have availed of his support
on countless occasions; without it, the work of devising these files
would have been much more difficult and they would certainly
have contained more errors than they do now.

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Roinn na Matamaíse,
Coláiste na hOllscoile,
Baile Átha Cliath.