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Monthly Notices of the Royal Astronomical Society: LaTeX style guide for authors

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ABSTRACT
This guide is for authors who are preparing papers for the Monthly Notices of the Royal Astronomical Society using the LaTeX document preparation system and the MN style file.

Key words: LaTeX – style files: `mn.sty` – sample text – user guide.

1 INTRODUCTION

In addition to the standard submission of hardcopy from authors, Monthly Notices accepts machine-readable forms of papers in LaTeX. The layout design for Monthly Notices has been implemented as a LaTeX style file. The MN style is based on the `ARTICLE` style as discussed in the LaTeX manual (Lamport 1986). Commands which differ from the standard LaTeX interface, or which are provided in addition to the standard interface, are explained in this guide. This guide is not a substitute for the LaTeX manual itself. Authors planning to submit their papers in LaTeX are advised to use `mn.sty` as early as possible in the creation of their files.

1.1 The MN document style

The use of LaTeX document styles allows a simple change of style (or style option) to transform the appearance of your document. The MN style file preserves the standard LaTeX interface such that any document that can be produced using the standard LaTeX `ARTICLE` style can also be produced with the MN style. However, the measure (or width of text) is narrower than the default for `ARTICLE`, and even narrower than for the `A4` style, therefore line breaks will change and long equations may need re-setting.

When your article is printed in the Monthly Notices journal, it is typeset in Monotype Times. As most authors do not have this font, it is likely that the make-up will change with the change of font. For this reason, we ask you to ignore details such as slightly long lines, page stretching, or figures falling out of synchronization, because these details can be dealt with at a later stage.

1.2 General style issues

For general style issues, authors are referred to the 'Instructions for Authors' on the inside back cover of Monthly Notices. Authors who are interested in the details of style are referred to Butcher (1992) and The Chicago Manual (1982). The language of the journal is British English and spelling should conform to this.

Use should be made of symbolic references (`\ref`) in order to protect against late changes of order, etc.

1.3 Submission of LaTeX articles to the journal

Authors are urged to state that electronic submission is intended when first submitting their paper. Papers should initially be submitted in the usual way to the Executive Secretary, Royal Astronomical Society, Burlington House, London W1V 0NL, as set out on the inside front cover of each issue of Monthly Notices. Three hard copies should be supplied. One of these copies should be single-sided and double-spaced throughout, while the other two should be weight-reduced, by being either single-spaced or double-sided. Note that articles, or revised versions thereof, may not be submitted by electronic mail. Appropriate gaps should be left for figures, original versions and copies of which should also be supplied. Authors should ensure that their figures are suitable (in terms of lettering size, etc.) for the reductions they intend.

Authors who wish to include PostScript artwork directly into their articles can do so, by using either Tomas Rokicki's EPSF macros or Trevor Darrell's PSFIG macros (both of which are supplied with the DVIPS PostScript driver). Please remember to supply any additional figure macros you use with your article. Please also supply hard copies of your figures, for the use of production editors and as a back-up.

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Authors should not attempt to use implementation specific `\special`'s directly.

The correct Monthly Notices House Style should be used – details are given in the Instructions for Authors, in the Style Guide published in the 1 January 1993 issue (MNRAS, 260, 1), and in Appendix C of this guide. No disk should be submitted at this initial stage. When the paper has been accepted, the double-spaced copy will be marked up by sub-editors at Blackwell Science (BS) and returned to you for correction. When the requested corrections have been made, you should send the following to BS:

(i) a 3.5-inch or 5.25-inch PC disk (double- or high-density or Apple Mac), containing the *corrected* version of the paper, plus any macro files you have been using. The files for the final version should be text-only, with no system-dependent control codes (often called an ASCII file);
(ii) two hard copies of the corrected version, plus the original marked copy of the article; *any further author corrections should be clearly indicated on the latter*;
(iii) a signed statement that the revised copy and the disk do indeed correspond.

In addition, you should submit the following information concerning the disk and its contents:

(i) the disk format (e.g. IBM 360k);
(ii) how many files the disk contains, their names, a description of the file contents and the number of pages each file will produce when printed; details of any user-defined macros;
(iii) the computer system and implementation of LaTeX used (e.g. IBM AT, PCTeX v3.0).

Ensure that any author-defined macros are gathered together in the file, just before the `\begin{document}` command.

Unless the layout of the paper has to be significantly changed by the typesetter (for example, if the gaps left for the figures are not suitable), it will not be necessary to send you a typeset proof to check, as the paper will be set directly from your submitted disk. However, you should note that, if serious problems are encountered with the coding of your paper (missing author-defined macros, for example), it may prove necessary to divert the paper to conventional typesetting.

2 USING THE MN STYLE

If the file `mn.sty` is not already in the appropriate system directory for LaTeX files, either arrange for it to be put there, or copy it to your working directory. The MN document style is implemented as a complete document style, *not* a document style option. In order to use the MN style, replace `article` by `mn` in the `\documentstyle` command at the beginning of your document:

```
\documentstyle{article}
```

is replaced by

```
\documentstyle{mn}
```

In general, the following standard document style options should *not* be used with the MN style:

(i) `10pt`, `11pt`, `12pt` – unavailable;
(ii) `twoside` (no associated style file) – `twoside` is the default;
(iii) `fleqn`, `leqno`, `titlepage` – should not be used (`fleqn` is already incorporated into the MN style);
(iv) `twocolumn` – is not necessary as it is the default style.

If necessary, `draft`, `proc`, `ifthen` and `bezier` can be used.

The MN style file has been designed to operate with the standard version of `lfonts.tex` that is distributed as part of LaTeX. If you have access to the source file for this guide, `mnguide.tex`, and to the specimen article, `mnsample.tex`, attempt to typeset both of these. If you find font problems you might investigate whether a non-standard version of `lfonts.tex` has been installed in your system.

2.1 Additional document style options

The following additional style options are available with the MN style:

`onecolumn` – to be used *only* when two-column output is unable to accommodate long equations;
`landscape` – for producing wide figures and tables which need to be included in landscape format (i.e. sideways) rather than portrait (i.e. upright). This option is described below.
`doublespacing` – this will double-space your article by setting `\baselinestretch` to 2.
`referee` – 12/20pt text size, single column, measure 16.45cm, left margin 2.75cm on A4 page.
`galley` – no running heads, no attempt to align the bottom of columns.

2.2 Landscape pages

If a table or illustration is too wide to fit the standard measure, it must be turned, with its caption, through 90 degrees anticlockwise. Landscape illustrations and/or tables cannot be produced directly using the MN style file because TeX itself cannot turn the page, and not all device drivers provide such a facility. The following procedure can be used to produce such pages.

(i) Use the `table*` or `figure*` environments in your document to create the space for your table or figure on the appropriate page of your document. Include an empty caption in this environment to ensure the correct numbering of subsequent tables and figures. For instance, the following code prints a page with the running head, a message half way down and the figure number towards the bottom. If you are including a plate, the running headline is different, and you need to key in the three lines that are marked with `% **`, with an appropriate headline.

```
% ** \clearpage
% ** \thispagestyle{plate}
% ** \plate{Opposite p.~812, MNRAS, {\bf 261}}
\begin{figure*}
  \vbox to220mm{\vfil Landscape figure to go here.
  \caption{}
 \vfil}
 \label{landfig}
\end{figure*}
```

(ii) Create a separate document with the corresponding document style but also with the `landscape` document style option, and include the `\pagestyle` command, as follows:

```
\documentstyle[landscape]{mn}
\pagestyle{empty}
```

(iii) Include your complete tables and illustrations (or space for these) with captions using the `table*` and `figure*` environments.

(iv) Before each float environment, use the `\setcounter` command to ensure the correct numbering of the caption. For example,

```
\setcounter{table}{0}
\begin{table*}
 \begin{minipage}{115mm}
 \caption{The Largest Optical Telescopes.}
 \label{tab1}
 \begin{tabular}{@{}llllcll}
   :
 \end{tabular}
 \end{minipage}
\end{table*}
```

The corresponding example for a figure would be:

```
\clearpage
\setcounter{figure}{12}
\begin{figure*}
 \vspace{144mm}
 \caption{Chart for a cold plasma.}
 \label{fig13}
\end{figure*}
```

3 ADDITIONAL FACILITIES

In addition to all the standard LaTeX design elements, the MN style includes the following features.

(i) Extended commands for specifying a short version of the title and author(s) for the running headlines.
(ii) A `keywords` environment and a `\nokeywords` command.
(iii) Use of the `description` environment for unnumbered lists.
(iv) A `\contcaption` command to produce captions for continued figures or tables.

In general, once you have used the additional `mn.sty` facilities in your document, do not process it with a standard LaTeX style file.

3.1 Titles and author's name

In the MN style, the title of the article and the author's name (or authors' names) are used both at the beginning of the article for the main title and throughout the article as running headlines at the top of every page. The title is used on odd-numbered pages (rectos) and the author's name appears on even-numbered pages (versos). Although the main heading can run to several lines of text, the running headline must be a single line ($\leq$ 45 characters). Moreover, the main heading can also incorporate new line commands (e.g. `\\`) but these are not acceptable in a running headline. To enable you to specify an alternative short title and an alternative short author's name, the standard `\title` and `\author` commands have been extended to take an optional argument to be used as the running headline. The running headlines for this guide were produced using the following code:

```
\title[Monthly Notices: \LaTeX\ guide for authors]
  {Monthly Notices of the Royal Astronomical
  Society: \\ \LaTeX\ style guide for authors}
```

and

```
\author[A. Woollatt et al.]
  {A.~Woollatt,$^1$\thanks{Affiliated to ICRA.}
  M.~Reed,$^1$ R.~Mulvey,$^1$ K.~Matthews,$^1$
  D.~Starling,$^1$ Y.~Yu,$^1$
  \newauthor % starts a new line in the
             % author environment
  A.~Richardson$^1$ and P.~Smith$^2$\\
  $^1$Cambridge University Press, Shaftesbury
      Road, Cambridge CB2 2BS\\
  $^2$Blackwell Science,
      23 Ainslie Place, Edinburgh EH3 6AJ}
```

The `\thanks` note produces a footnote to the title or author.

3.2 Key words and abstracts

At the beginning of your article, the title should be generated in the usual way using the `\maketitle` command. Immediately following the title you should include an abstract followed by a list of key words. The abstract should be enclosed within an `abstract` environment, followed immediately by the key words enclosed in a `keywords` environment. For example, the titles for this guide were produced by the following source:

```
\maketitle
\begin{abstract}
 This guide is for authors who are preparing
 papers for the Monthly Notices of the
 Royal  Astronomical Society using the \LaTeX\
 document preparation system and the MN style
 file.
\end{abstract}
\begin{keywords}
 \LaTeX\ -- style files: \verb"mn.sty"\ --
 sample text -- user guide.
\end{keywords}

\section{Introduction}
  :
```

The heading '**Key words**' is included automatically and the key words are followed by vertical space. If, for any reason, there are no key words, you should insert the `\nokeywords` command immediately after the end of the `abstract` environment. This ensures that the vertical space after the abstract and/or title is correct and that any `thanks` acknowledgments are correctly included at the bottom of the first column. For example,

```
\maketitle
\begin{abstract}
```

```
  :
\end{abstract}
\nokeywords

\section{Introduction}
  :
```

3.3 Lists

The MN style provides numbered lists using the `enumerate` environment and unnumbered lists using the `description` environment with an empty label. Bulleted lists are not part of the MN style and the `itemize` environment should not be used.

The enumerated list numbers each list item with roman numerals:

(i) first item
(ii) second item
(iii) third item

Alternative numbering styles can be achieved by inserting a redefinition of the number labelling command after the `\begin{enumerate}`. For example, the list

(1) first item
(2) second item
(3) etc...

was produced by:

```
\begin{enumerate}
 \renewcommand{\theenumi}{(\arabic{enumi})}
  \item first item
        :
\end{enumerate}
```

Unnumbered lists are provided using the `description` environment. For example,

First unnumbered item which has no label and is indented from the left margin.
Second unnumbered item.
Third unnumbered item.

was produced by:

```
\begin{description}
 \item First unnumbered item...
 \item Second unnumbered item.
 \item Third unnumbered item.
\end{description}
```

3.4 Captions for continued figures and tables

The `\contcaption` command may be used to produce a caption with the same number as the previous caption (for the corresponding type of float). For instance, if a very large table does not fit on one page, it must be split into two floats; the second float should use the `\contcaption` command:

```
\begin{table}
 \contcaption{}
  \begin{tabular}{@{}lccll}
  :
  \end{tabular}
\end{table}
```

Figure 1. An example figure in which space has been left for the artwork.

4 SOME GUIDELINES FOR USING STANDARD FACILITIES

The following notes may help you achieve the best effects with the MN style file.

4.1 Sections

LaTeX provides five levels of section headings and they are all defined in the MN style file:

```
\section
\subsection
\subsubsection
\paragraph
\subparagraph
```

Section numbers are given for section, subsection, subsubsection and paragraph headings. Section headings are automatically converted to upper case; if you need any other style, see the example in Section 5.

If you find your section/subsection (etc.) headings are wrapping round, you must use the `\\*` to end individual lines and include the optional argument `[]` in the section command. This ensures that the turnover is flushleft.

4.2 Illustrations (or figures)

The MN style will cope with most positioning of your illustrations and you should not normally use the optional positional qualifiers on the `figure` environment which would override these decisions. See 'Instructions for Authors' in Monthly Notices for submission of artwork. Figure captions should be below the figure itself, therefore the `\caption` command should appear after the figure or space left for an illustration. For example, Fig. 1 is produced using the following commands:

```
\begin{figure}
 \vspace{5.5cm}
 \caption{An example figure in which space has
          been left for the artwork.}
 \label{sample-figure}
\end{figure}
```

Table 1. Radio-band beaming model parameters for FSRQs and BL Lacs.

Class	γ_1	γ_2	$\langle\gamma\rangle$	G	f	θ_c
BL Lacs	5	36	7	-4.0	1.0×10^{-2}	10°
FSRQs	5	40	11	-2.3	0.5×10^{-2}	14°

G is the slope of the Lorentz factor distribution, i.e. $n(\gamma)\propto\gamma^G$, extending between γ_1 and γ_2, with mean value $\langle\gamma\rangle$, f is the ratio between the intrinsic jet luminosity and the extended, unbeamed luminosity, while θ_c is the critical angle separating the beamed class from the parent population.

4.3 Tables

The MN style will cope with most positioning of your tables and you should not normally use the optional positional qualifiers on the `table` environment which would override these decisions. Table captions should be at the top, therefore the `\caption` command should appear before the body of the table.

The `tabular` environment can be used to produce tables with single horizontal rules, which are allowed, if desired, at the head and foot only. This environment has been modified for the MN style in the following ways:

(i) additional vertical space is inserted on either side of a rule;
(ii) vertical lines are not produced.

Commands to redefine quantities such as `\arraystretch` should be omitted. For example, Table 1 is produced using the following commands. Note that `\rmn` will produce a roman character in math mode. It has been defined in two ways in the source code of the guide, one way for authors using the New Font Selection Scheme, and the other for authors using the old font selection scheme. There are also `\bld` and `\itl`, which produce bold face and text italic in math mode.

```
\begin{table}
 \caption{Radio-band beaming model parameters
          for FSRQs and BL Lacs.}
 \label{symbols}
 \begin{tabular}{@{}lcccccc}
  Class & $\gamma _1$ & $\gamma _2$
        & $\langle \gamma \rangle$
        & $G$ & $f$ & $\theta _{\rmn{c}}$ \\
  BL Lacs &5 & 36 & 7 & $-4.0$
        & $1.0\times 10^{-2}$ & 10$^\circ$ \\
  FSRQs & 5 & 40 & 11 & $-2.3$
        & $0.5\times 10^{-2}$ & 14$^\circ$ \\
 \end{tabular}

 \medskip
 {\em G} is the slope of the Lorentz factor
   :
 class from the parent population.
\end{table}
```

If you have a table that is to extend over two columns, you need to use `table*` in a minipage environment, i.e., you can say

```
\begin{table*}
\begin{minipage}{80mm}
 \caption{Caption which will wrap round to the
          width of the minipage environment.}
 \begin{tabular}{%
       :
 \end{tabular}
\end{minipage}
\end{table*}
```

The width of the minipage should more or less be the width of your table, so you can only guess on a value on the first pass. The value will have to be adjusted when your article is typeset in Times, so don't worry about making it the exact size.

4.4 Running headlines

As described above, the title of the article and the author's name (or authors' names) are used as running headlines at the top of every page. The headline on left-hand pages can list up to three names; for more than three use et al. The `\pagestyle` and `\thispagestyle` commands should *not* be used. Similarly, the commands `\markright` and `\markboth` should not be necessary.

4.5 Typesetting mathematics

4.5.1 Displayed mathematics

The MN style will set displayed mathematics flush with the left margin, provided that you use the LaTeX standard of open and closed square brackets as delimiters. The equation

$$\sum_{i=1}^p \lambda_i = \mathrm{trace}(\mathbf{S})$$

was typeset in the MN style using the commands

```
\[
 \sum_{i=1}^p \lambda_i = \rmn{trace}(\bld{S})
\]
```

Note the difference between the positioning of this equation and of the following centred equation,

$$\alpha_{j+1} > \bar{\alpha}+ks_{\alpha}$$

which was (wrongly) typeset using double dollars as follows:

```
$$ \alpha_{j+1} > \bar{\alpha}+ks_{\alpha} $$
```

4.5.2 Bold math italic / bold symbols

To get bold math italic you can use `\boldmath` (which only works for the 'normal' size), but in many implementations of LaTeX this has not been defined at 9pt. An alternative is to use `\bmath` which works for all sizes. e.g.

```
\[
  d(\bmath{s_{t_u}}) = \langle [RM(\bmath{X_y}
  + \bmath{s_t}) - RM(\bmath{x_y})]^2 \rangle
\]
```

to produce:

$$d(\boldsymbol{s_{t_u}}) = \langle [RM(\boldsymbol{X_y} + \boldsymbol{s_t}) - RM(\boldsymbol{x_y})]^2 \rangle$$

Working this way, scriptstyle and scriptscriptstyle sizes will take care of themselves.

4.5.3 Bold Greek

Bold lowercase Greek characters can now be obtained by prefixing the normal (unbold) symbol name with a 'b', e.g. `\bgamma` gives $\boldsymbol{\gamma}$. This rule does not apply to bold `\eta`, as this would lead to a name clash with `\beta`. Instead use `\boldeta` for bold eta. Note that there is no `\omicron` (so there is no `\bomicron`), just use 'o' in math mode for omicron (o) and '`\bmath{o}`' for bold omicron ($\boldsymbol{o}$).

For bold uppercase Greek, prefix the unbold character name with `\mathbf`, e.g. `\mathbf\Gamma` gives $\mathbf{\Gamma}$. Upper and lowercase Greek characters are available in all typesizes.

You can then use these definitions in math mode, as you would normal Greek characters:

```
\[
  \balpha_{\bmu} = \mathbf{\Theta} \alpha.
\]
```

will produce

$\boldsymbol{\alpha}_{\boldsymbol{\mu}} = \mathbf{\Theta}\alpha.$

4.5.4 Upright Greek characters

You can obtain upright Greek characters if you have access to the American Maths Society Euler fonts (version 2.0), but you may not have these. In this case, you will have to use the normal math italic symbols and the typesetter will substitute the corresponding upright characters. You will make this easier if you can use the macros `\upi`, `\umu` and `\upartial` etc. in your text to indicate the need for upright characters, together with the following definitions in the preamble (before `\begin{document}`):

Authors with AMS fonts

```
\ifCUPmtlplainloaded \else
  \DeclareSymbolFont{UPM}{U}{eur}{m}{n}
  \SetSymbolFont{UPM}{bold}{U}{eur}{b}{n}
  \DeclareMathSymbol{\upi}{0}{UPM}{"19}
  \DeclareMathSymbol{\umu}{0}{UPM}{"16}
  \DeclareMathSymbol{\upartial}{0}{UPM}{"40}
\fi
```

Authors without AMS fonts

```
\ifCUPmtlplainloaded \else
  \def\umu{\mu}
  \def\upi{\pi}
  \def\upartial{\partial}
\fi
```

Wether you have AMS fonts or not, the `\if..` and `\fi` are required in the above examples to ensure that when your article is typeset in Monotype Times, the correct definitions for these symbols are used.

The sample pages and guide can be made to use AMS fonts if you have them. To use them, just uncomment the following line in the preamble of `mnguide.tex` and `mnsample.tex`:

```
%\AMStwofontstrue
```

If you do this, the following upright symbols are used in the sample pages and guide: `\upi`, `\umu` and `\upartial`.

4.5.5 Special symbols

The macros for the special symbols in Tables 2 and 3 have been taken from the Springer Verlag 'Astronomy and Astrophysics' design, with their permission. They are directly compatible and use the same macro names. These symbols will work in all text sizes, but are only guaranteed to work in text and displaystyles. Some of the symbols will not get any smaller when they are used in sub- or superscripts, and will therefore be displayed at the wrong size. Don't worry about this as the typesetter will be able to sort this out.

4.6 Bibliography

References to published literature should be quoted in text by author and date: e.g. Draine (1978) or (Begelman, Blandford & Rees 1984). Where more than one reference is cited having the same author(s) and date, the letters a,b,c, ... should follow the date; e.g. Smith (1988a), Smith (1988b), etc.

4.6.1 References in the text

References in the text are given by author and date, and, whichever method is used to produce the bibliography, the references in the text are done in the same way. Each bibliographical entry has a key, which is assigned by the author and used to refer to that entry in the text. There is one form of citation – `\cite{key}` – to produce the author and date, and another form – `\shortcite{key}` – which produces the date only. Thus, Stella & Campana (1991) is produced by

```
Stella \& Campana \shortcite{sc}
```

while (Misner et al. 1973) is produced by

```
\cite{mtw}
```

When you introduce a three-author paper, you should list all three authors at the first citation, and thereafter use et al.

4.6.2 The list of references

The following listing shows some references prepared in the style of the journal; the code produces the references at the end of this guide. The following rules apply for the ordering of your references:

(i) if an author has written several papers, some with other authors, the rule is that the single-author papers precede the two-author papers, which, in turn, precede the multi-author papers;
(ii) within the two-author paper citations, the order is determined by the second author's surname, regardless of date;
(iii) within the multi-author paper citations, the order is chronological, regardless of authors' surnames.

Table 2. Special symbols which can only be used in math mode.

Input	Explanation	Output	Input	Explanation	Output
`\la`	less or approx	$\lesssim$	`\ga`	greater or approx	$\gtrsim$
`\getsto`	gets over to	$\leftrightarrows$	`\cor`	corresponds to	$\widehat{=}$
`\lid`	less or equal	$\leqq$	`\gid`	greater or equal	$\geqq$
`\sol`	similar over less	$\underset{<}{\sim}$	`\sog`	similar over greater	$\underset{>}{\sim}$
`\lse`	less over simeq	$\underset{\simeq}{<}$	`\gse`	greater over simeq	$\underset{\simeq}{>}$
`\grole`	greater over less	$\gtrless$	`\leogr`	less over greater	$\lessgtr$
`\loa`	less over approx	$\lessapprox$	`\goa`	greater over approx	$\gtrapprox$

Table 3. Special symbols which don't have to be used in math mode.

Input	Explanation	Output	Input	Explanation	Output
`\sun`	sun symbol	$\odot$	`\degr`	degree	$^{\circ}$
`\diameter`	diameter	$\varnothing$	`\sq`	square	$\square$
`\fd`	fraction of day	$\stackrel{\mathrm{d}}{.}$	`\fh`	fraction of hour	$\stackrel{\mathrm{h}}{.}$
`\fm`	fraction of minute	$\stackrel{\mathrm{m}}{.}$	`\fs`	fraction of second	$\stackrel{\mathrm{s}}{.}$
`\fdg`	fraction of degree	$\stackrel{\circ}{.}$	`\fp`	fraction of period	$\stackrel{\mathrm{p}}{.}$
`\farcs`	fraction of arcsecond	$\stackrel{\prime\prime}{.}$	`\farcm`	fraction of arcmin	$\stackrel{\prime}{.}$
`\arcsec`	arcsecond	$^{\prime\prime}$	`\arcmin`	arcminute	$^{\prime}$

```
\begin{thebibliography}{}
  \bibitem[\protect\citename{Butcher }1992]{bu}
    Butcher J., 1992, Copy-editing: The Cambridge
    Handbook, 3rd edn. Cambridge Univ. Press,
    Cambridge
  \bibitem[\protect\citename{The Chicago Manual }%
    1982]{ch} The Chicago Manual of Style, 1982.
    Univ. Chicago Press, Chicago
  \bibitem[\protect\citename{Blanco }1991]{bl}
    Blanco P., 1991, PhD thesis, Edinburgh
    University
  \bibitem[\protect\citename{Brown \& Jones }%
    1989]{bj} Brown A. B., Jones C. D., 1989,
    in Robinson E. F., Smith G. H., eds,
    Proc. IAU Symp. 345, Black Dwarfs.
    Kluwer, Dordrecht, p. 210
  \bibitem[\protect\citename{Edelson }1987]{ed}
    Edelson R. A., 1987, ApJ, 313, 651
  \bibitem[\protect\citename{Lamport }1986]{la}
    Lamport L., 1986, \LaTeX: A Document
    Preparation System. Addison--Wesley, New York
  \bibitem[\protect\citename{Mirabel \& Sanders }%
    1989]{ms} Mirabel I. F., Sanders D. B., 1989,
    ApJ, 340, L53
  \bibitem[\protect\citename{Misner et al.\ }%
    1973]{mtw} Misner C. W., Thorne K. S.,
    Wheeler J. A., 1973, Gravitation.
    Freeman, San Francisco
  \bibitem[\protect\citename{Sopp \& Alexander }%
    1991]{sa} Sopp H. M., Alexander P., 1991,
    MNRAS, 251, 112
  \bibitem[\protect\citename{Stella \& Campana }%
    1991]{sc} Stella L., Campana S., 1991, in
    Treves A., Perola G. C., Stella L., eds,
    Iron Line Diagnostic in X-ray Sources.
    Springer--Verlag, Berlin, p. 230
\end{thebibliography}
```

Each entry takes the form

```
\bibitem[\protect\citename{Author(s), }%
  Date]{tag} Bibliography entry
```

where `Author(s)` should be the author names as they are cited in the text, `Date` is the date to be cited in the text, and `tag` is the tag that is to be used as an argument for the `\cite{}` and `\shortcite{}` commands. `Bibliography entry` should be the material that is to appear in the bibliography, suitably formatted.

4.7 Appendices

The appendices in this guide were generated by typing:

```
\appendix
\section{For authors}
     :
\section{For editors}
```

You only need to type `\appendix` once. Thereafter, every `\section` command will generate a new appendix which will be numbered A, B, etc.

5 EXAMPLE OF SECTION HEADING WITH SMALL CAPS, lowercase, *ITALIC*, AND BOLD GREEK SUCH AS $\boldsymbol{\mu}^{\boldsymbol{\kappa}}$

Was produced with:

```
\section[]{Example of section heading with\\*
  S{\sevensize MALL} C{\sevensize APS},
  \lowercase{lowercase}, \textbfit{italic},
  and bold\\* Greek such as
  $\bmu^{\bkappa}$}
```

REFERENCES

Butcher J., 1992, Copy-editing: The Cambridge Handbook, 3rd edn. Cambridge Univ. Press, Cambridge
The Chicago Manual of Style 1982. Univ. Chicago Press, Chicago
Blanco P., 1991, PhD thesis, Edinburgh University
Brown A. B., Jones C. D., 1989, in Robinson E. F., Smith G. H., eds, Proc. IAU Symp. 345, Black Dwarfs. Kluwer, Dordrecht, p. 210
Edelson R. A., 1987, ApJ, 313, 651
Lamport L., 1986, LaTeX: A Document Preparation System. Addison–Wesley, New York
Mirabel I. F., Sanders D. B., 1989, ApJ, 340, L53
Misner C. W., Thorne K. S., Wheeler J. A., 1973, Gravitation. Freeman, San Francisco
Sopp H. M., Alexander P., 1991, MNRAS, 251, 112
Stella L., Campana S., 1991, in Treves A., Perola G. C., Stella L., eds, Iron Line Diagnostic in X-ray Sources. Springer–Verlag, Berlin, p. 230

APPENDIX A: FOR AUTHORS

Table A1 is a list of design macros which are unique to MN. The list displays each macro's name and description.

APPENDIX B: FOR EDITORS

The additional features shown in Table B1 may be used for production purposes.

APPENDIX C: MONTHLY NOTICES JOURNAL STYLE

Authors submitting TeX or LaTeX papers to Monthly Notices may wish to note the following points regarding journal style. Adherence to correct style from the start will obviously save time and effort later on, in terms of fewer requested subeditorial corrections. The notes given here relate to common style errors found in Monthly Notices manuscripts, and are *not* intended to be exhaustive. Please see the editorials in issues 257/2 and 260/1, as well as any recent issue of the journal, for more details. As far as possible, the subeditor will indicate which of your changes would be best done globally, thus saving you time.

C1 Punctuation

When deciding where to add commas, it may be helpful to read through the sentence and note where the natural 'pauses' occur. The needs of readers for whom English is not a first language should be borne in mind when punctuating long sentences. For example, consider the following sentence as it appeared in Monthly Notices: 'When we do not limit ourselves by constraints arising from the choice of an initial fluctuation spectrum, structures in an open universe, including the peculiar velocity structure, can be reproduced in a flat Lemaître universe for a large part of their evolution.' Now consider the same sentence without commas: 'When we do not limit ourselves by constraints arising from the choice of an initial fluctuation spectrum structures in an open universe including the peculiar velocity structure can be reproduced in a flat Lemaître universe for a large part of their evolution.'

C2 Spelling

Please use British spelling – e.g. centre not center, labelled not labeled. The following style regarding -ise and -ize spellings is followed. -ise: devise, surprise, comprise, revise, exercise, analyse. -ize: recognize, criticize, minimize, emphasize, organize.

C3 Titles and section/subsection headings

With the exception of section headings (e.g. **INTRODUCTION**...), capital letters should be used only where they occur in a normal sentence – e.g. '***ROSAT*** **observations of the unusual star**...', not '***ROSAT*** **Observations of the Unusual Star**...'.

C4 Key words

The list of Monthly Notices key words is published with the 4th issue of each volume. No other key words should be used. Please use the correct layout for key words:

Key words: galaxies: active – galaxies: Seyfert – radio continuum: galaxies.

C5 Hyphens and N-rules

(i) Hyphens (one dash in TeX/LaTeX). Monthly Notices uses hyphens for compound adjectives (e.g. low-density gas, least-squares fit, two-component model). This also applies to simple units (e.g. 1.5-m telescope, 284.5-nm line), but not to complex units or ranges, which could become cumbersome (e.g. 15 km s^{-1} feature, 100–200 μm observations).

(ii) N-rules (two dashes in TeX/LaTeX). These are used (a) to separate key words, (b) as parentheses (e.g. 'the results – assuming no temperature gradient – are indicative of...), (c) to denote a range (e.g. 1.6–2.2 μm), and (d) to denote the joining of two words (e.g. Kolmogorov–Smirnov test, Herbig–Haro object).

(iii) The M-rule (three dashes in TeX/LaTeX) is not used in Monthly Notices.

C6 References

It is important to use the correct reference style, details of which can be found in the editorials cited above, and which is demonstrated in any recent issue of the journal. The main points are summarized below.

(i) In text – for three-author papers, give all three authors at first mention, and 'et al.' thereafter.

(ii) In references list – no bold or italic, no commas after author surnames, and no ampersand between final two author names. Use simplified abbreviations for frequently used journals (e.g. MNRAS, ApJ, A&A, PASP – see full list in editorial in issue 260/1). List all authors if eight or less, otherwise 'et al.' For example,

Biggs J.D., Lyne A.G., 1992, MNRAS, 254, 257

Table A1. Authors' notes.

`\title[optional short title]{long title}`	short title used in running head
`\author[optional short author(s)]{long author(s)}`	short author(s) used in running head
`\newauthor`	starts a new line in the author environment
`\begin{abstract}...\end{abstract}`	for abstract on titlepage
`\begin{keywords}...\end{keywords}`	for keywords on titlepage
`\nokeywords`	if there are no keywords on titlepage
`\begin{figure*}...\end{figure*}`	for a double spanning figure in two-column mode
`\begin{table*}...\end{table*}`	for a double spanning table in two-column mode
`\plate{Opposite p.~812, MNRAS, {\bf 261}}`	used with `\thispagestyle{plate}` for plate pages
`\contcaption{}`	for continuation figure and table captions
`\bmath{math text}`	Bold math italic / symbols.
`\textbfit{text}`, `\mathbfit{text}`	Bold text italic (defined in the preamble of `mnsample.tex`).
`\textbfss{text}`, `\mathbfss{text}`	Bold text sans serif (defined in the preamble of `mnsample.tex`).

Table B1. Editors' notes.

`\pagerange{000--000}`	for catchline, note use of en-rule
`\pagerange{L00--L00}`	for letters option, used in catchline
`\volume{000}`	volume number, for catchline
`\pubyear{0000}`	publication year, for catchline
`\microfiche{MN000/0}`	for articles accompanied by microfiche
`\journal`	replace the whole catchline at one go
`[doublespacing]`	documentstyle option for doublespacing
`[galley]`	documentstyle option for running to galley
`[landscape]`	documentstyle option for landscape illustrations
`[letters]`	documentstyle option, for short communications (adds L to folios)
`[onecolumn]`	documentstyle option for one-column
`[referee]`	documentstyle option for 12/20pt, single col, 39pc measure
`\bsp`	typesets the final phrase 'This paper has been produced using the Royal Astronomical Society/Blackwell Science LaTeX style file.'

Brown A.B., Jones C.D., 1989, in Robinson E.F., Smith G.H., eds, Proc. IAU Symp. 345, Black Dwarfs. Kluwer, Dordrecht, p. 210

Felsteiner J., Opher R., 1991, in Treves A., ed., Iron Line Diagnostics in X-ray Sources. Springer-Verlag, Berlin, p. 209

Gunn J.E., Knapp G., 1993, in Soifer B.T., ed., ASP Conf. Ser. Vol. 43, Sky Surveys. Astron. Soc. Pac., San Francisco, p. 267

Peebles P.J.E., 1980, The Large-Scale Structure of the Universe. Princeton Univ. Press, Princeton, NJ

Pounds K.A. et al., 1993, MNRAS, 260, 77

Williams B.G., 1992, PhD thesis, Univ. Edinburgh

C7 Maths

Scalar variables are italic; vectors are bold italic; matrices are 'bold Univers' font (like bold sans serif). Differential d, complex i, exponential e, sin, cos, tan, log, etc., are roman. Sub/superscripts that are physical variables are italic, while those that are just labels are roman (e.g. C_p, but $T_{\rm eff}$). Equations should be punctuated as part of the sentence.

C8 Miscellaneous

e.g., i.e., cf., etc., are roman. Single quotes ' ' not double quotes " ". Take care to use correct units – see recent issues for details. Use superscript −1, not solidus /, for units – e.g. km s^{-1} not km/s. The unit of arcseconds is arcsec when used to denote angular size or separation (e.g. 'beamsize 12 arcsec', '30 arcsec west of the star'); use $''$ for positions (e.g. Dec. $-30^\circ\ 29'\ 23''$) (similarly for arcminutes). The unit of magnitudes is mag, not superscript m. Percentages should be written 'per cent', not %. Use the degree symbol $^\circ$ (`$^\circ$`) except to denote, e.g., areas, where 'deg^2' may be more appropriate (e.g. 'a survey area of 3 deg^2'). Degree symbols should be positioned above the decimal point if there is one – i.e. $23\overset{\circ}{.}4$ not 23.4° (similarly for superscript h, m, s, and $'$, $''$ symbols in coordinates). See guide for coding. Ionized species should be denoted by small caps, with a thin space – e.g. He II, C IV, [Fe II] 465.8 nm, N III 463.4 nm. If lack of the correct font at your site prevents this from coming out on your printout, it would be helpful if you were to indicate as such on your manuscript so that the subeditor knows that there is no need for correction. Computer software (e.g. FIGARO) should be in small capitals. Satellite names should be italic (e.g. *Ginga, IRAS*). The correct bracket order is {[( )]}.

APPENDIX D: TROUBLE-SHOOTING

Authors may from time to time encounter problems with the preparation of their papers in TeX/LaTeX. The appropriate action to take will depend on the nature of the problem – the following is intended to act as a guide.

(i) If a problem is with TeX/LaTeX itself, rather than with the actual macros, please refer to the appropriate handbooks for initial advice.† If the solution cannot be found, and you suspect that the problem lies with the macros, then please

† TeX: Knuth D., 1986, The TeXbook. Addison Wesley; LaTeX: Lamport L., 1985, LaTeX User's Guide and Reference Manual. Addison Wesley.

contact the RAS Journal Production team at Blackwell Science (BS), 23 Ainslie Place, Edinburgh EH3 6AJ, UK (Tel: 031 226 7232; Fax: 031 226 3803; omit the first zero if calling from outside the UK). The BS office will shortly be accessible by email – please see the Instructions for Authors on the inside back cover of Monthly Notices for details. Please provide precise details of the problem (what you were trying to do – ideally, include examples of source code as well – and what exactly happened; what error message was received).

(ii) Problems with page make-up, particularly in the two-column mode (e.g. large spaces between paragraphs, or under headings or figures; uneven columns; figures/tables appearing out of order). Please do *not* attempt to remedy these yourself using 'hard' page make-up commands – the typesetters at Cambridge University Press (CUP) will sort out problems when typesetting. (You may, if you wish, draw attention to particular problems when submitting the final version of your paper.)

(iii) If a required font is not available at your site, allow TEX to substitute the font and report the problem on your disk documentation form.

(iv) If you choose to use `\boldmath`, you may find that boldmath has not been defined locally for use with a particular size of font. If this is the case, you will get a message that reads something like:

```
LaTeX Warning: No \boldmath typeface in this size,
using \unboldmath on input line 44.
```

If you get this message, you are advised to use the alternative described in this guide for attaining bold face math italic characters, i.e. `\bmath{...}`.

D1 Fixes for coding problems

The new versions of the style files and macros have been designed to minimize the need for user-defined macros to create special symbols. Authors are urged, wherever possible, to use the following coding rather than create their own. This will minimize the danger of author-defined macros being accidentally 'over-ridden' when the paper is typeset in Monotype Times (see Section 4.5, 'Typesetting mathematics', in the LaTEX author guide).

(i) Fonts in sections and paper titles. The following are examples of styles that sometimes prove difficult to code.

Paper titles

A survey of *IRAS* galaxies at $\boldsymbol{\delta > 50^\circ}$

is produced by:

```
\title[A survey of IRAS galaxies at
      $\delta > 50^\circ$]
  {A survey of \textbfit{IRAS\/} galaxies at
   $\bmath{\delta > \bld{50}^\circ}$}
```

Observations of compact H II regions

is produced by:

```
\title[Observations of compact H\,{\normalsize
       \it II} regions]
  {Observations of compact H\,{\Large\bf II}
   regions}
```

Section headings

1 THE *IRAS* DATA FOR $\boldsymbol{\delta > 50^\circ}$

is produced by:

```
\section[]{The \textbfit{IRAS\/} data for
  $\bmath{\delta > \bld{50}^\circ}$
```

2 H II GALAXIES AT $\boldsymbol{z > 1.6}$

is produced by:

```
\section[]{H\,{\sevensize\bf II} galaxies at
  $\bmath{\lowercase{z} > \bld{1.6}}$}
```

Subsection headings

2.1 The *IRAS* data for $\boldsymbol{\delta > 50^\circ}$: galaxies at $\boldsymbol{z > 1.5}$

is produced by:

```
\subsection[]{The \textbfit{IRAS\/} data for
  $\bmath{\delta > \bld{50}^\circ}$: galaxies\\
  at $\bmath{z > \bld{1.5}}$}
```

2.2 Observations of compact H II regions

is produced by:

```
\subsection[]{Observations of compact
  H\,{\sevensize\bf II} regions}
```

2.2.1 A survey of radio galaxies for $\delta > 50^\circ$

is produced by:

```
\subsubsection[]{A survey of radio galaxies for
  $\delta > \itl{50}^\circ$}
```

2.2.2 Determination of T_{eff} in compact H II regions

is produced by:

```
\subsubsection[]{Determination of T$_{eff}$ in
  compact H\,{\sevensize\it II} regions}
```

(ii) Small capitals and other unusual fonts in table and figure captions:

Figure 1. Profiles of the Hα and N III lines observed.

is produced by:

```
\caption{Profiles of the H$\alpha$ and
  N\,{\sc iii} lines observed.}
```

(iii) Multiple author lists (to get the correct vertical spacing and wraparound on the title page of a multiple-author paper).

The variation in the strength of low-$\boldsymbol{l}$ solar $\boldsymbol{p}$-modes: 1981–2

Y. Elsworth, R. Howe, G.R. Isaac, C.P. McLeod, B.A. Miller, R. New, C.C. Speake and S.J. Wheeler

is produced by:

```
\title[The variation in the strength of low-$l$
  solar $p$-modes: 1981--2]%
  {The variation in the strength of
  low-$\bmath{l}$ solar
  $\bmath{p}$-modes: 1981--2}

\author[Y. Elsworth et al.]
  {Y. Elsworth, R. Howe, G.R. Isaac,\cr
  C.P. McLeod, B.A. Miller, R. New,\cr
  C.C. Speake and S.J. Wheeler}
```

(iv) Ionized species (as used in the examples above). The correct style calls for the use of small capitals and a thin space after the symbol for the element: e.g. for H II, use the code `\hbox{H\,{\sc ii}}`. The use of the `\hbox` will stop the H and the II being separated.

(v) Lower case greek pi (π), mu (μ) and partial (∂). In certain circumstances, the Monthly Notices style calls for these to be roman [when pi is used to denote the constant 3.1415..., mu is used to denote 'micro' in a unit (e.g. μm, μJy), and partial is a differential symbol]. See Subsubsection 4.5.4 for instructions.

(vi) Decimal degrees, arcmin, arcsec, hours, minutes and seconds. The symbol needs to be placed vertically above the decimal point. For example, the sentence

The observations were made along position angle $120\overset{\circ}{.}5$, starting from the central coordinates RA(1950) $= 19^{\rm h}\;22^{\rm m}\;18\overset{\rm s}{.}2$, Dec. (1950) $= 45^\circ\;18'\;36\overset{''}{.}4$

uses the following coding:

```
The observations were made along position angle
120\fdg 5, starting from the central coordinates
$\rmn{RA}(1950)=19^{\rmn{h}}~22^{\rmn{m}}~18\fs2$,
$\rmn{Dec.}~(1950)=45^\circ~18'~36\farcs 4$
```

(vii) The correct coding for the prime symbol $'$ is `\arcmin`, and that for $''$ is `\arcsec`; see the two tables on special symbols.

(viii) N-rules, hyphens and minus signs (see style guide for correct usage). To create the correct symbols in the sentence

The high-resolution observations were made along a line at an angle of -15° (east from north) from the axis of the jet, which runs north–south

you would use the following code:

```
The high-resolution observations were made along a
line at an angle of $-15^\circ$ (east from north)
from the axis of the jet, which runs north--south
```

(ix) Vectors and matrices should be bold italic and bold sans serif respectively. To create the correct fonts for the vector $\boldsymbol{x}$ and the matrix $\mathsf{\mathbf{P}}$, you should use `$\bmath{x}$` and `\textbfss{P}` respectively; `\mathbfss` is for use in math mode. Bold face text italic can be obtained by using `\textbfit{..}` and `\mathbfit{..}` for math mode.

(x) Bold italic superscripts and subscripts. To get these to come out in the correct font and the right size, you need to use `\bmath`. You can create the output $\boldsymbol{k_x}$ by typing `$\bmath{k_x}$`. Try to avoid using LaTeX commands to determine script sizes that are already defined in the style file. For example, macros such as

```
\newcommand{\th}{^\mbox{\tiny th}}
```

are generating extra work;

```
\newcommand{\th}{^{th}}
```

will do, and will get the size of the superscript right whether in main text, tables or captions (the use of `\tiny` over-rides the style file). Also, the `\mbox` is not necessary, as TeX won't split a superscript/subscript from its variable at a line break.

(xi) Calligraphic letters (uppercase only). Normal uppercase calligraphic can be produced with `\mathcal` as normal (in math mode). Bold calligraphic can be produced with `\bmath`. e.g. `$\bmath{\mathcal A}$` gives $\boldsymbol{\mathcal{A}}$.

(xii) Automatic scaling of brackets. The codes `\left` and `\right` should be used to scale brackets automatically to fit the equation being set. For example, to get

$$v = x \left(\frac{N+2}{N} \right)$$

use the code

```
\[
  v = x \left( \frac{N+2}{N} \right)
\]
```

(xiii) Roman font in equations. It is often necessary to make some symbols roman in an equation (e.g. units, subscripts). For example, to get the following output:

$$\sigma \simeq (r/13~h^{-1}~\mathrm{Mpc})^{-0.9}, \qquad \omega=\frac{\mathrm{N}-\mathrm{N}_{\mathrm{s}}}{\mathrm{N}_{\mathrm{R}}},$$

you should use:

```
\[
  \sigma \simeq (r/13~h^{-1}~\rmn{Mpc})^{-0.9},
  \qquad \omega=\frac{N-N_{\rmn{s}}}{N_{\rmn{R}}},
\]
```

(xiv) Continuation figure and table captions. See Section 3.4.

D2 Springer-Verlag macro names

These have been incorporated from the Astronomy & Astrophysics LaTeX style file, to aid in the creation of various commonly used astronomical symbols. Please see Subsection 4.5.5 for details.

This paper has been produced using the Royal Astronomical Society/Blackwell Science LaTeX style file.