

SAMPLE LATEX PAPER FOR BIT *

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Abstract.

This file serves as an illustration of how to prepare a $\text{\LaTeX} 2_{\epsilon}$ file for BIT. It gives advice on how to format theorems, and how to include figures and tables with captions correctly placed. The BIT style for bibliographies is also explained.

Each article should begin with an abstract. Abstract should be written in impersonal form. Abstract should not include references or displayed formulas!

AMS subject classification (2000): 65F20.

Key words: Manuscript preparation, sample file, BIT style.

1 Introduction.

Authors who prepare their articles using $\text{\LaTeX} 2_{\epsilon}$ can get them formatted in a style (almost) identical to that of BIT by using the style file `bit2e.cls`. Input that is suitable to $\text{\LaTeX} 2_{\epsilon}$ *article* style needs only few modifications besides changing the `documentstyle` to that above.

This note is written to exemplify the BIT style. The source file `sample2e.tex` and the style file `bit2e.cls`, which is necessary to run it, can be downloaded from <http://www.nada.kth.se/BIT/>. If you have any comments or find bugs please send email to ruhe@nada.kth.se.

2 Title page.

Use the \LaTeX `title` and `author` declarations and the `maketitle` command as usual. Authors can use full first name or initials only in the title. The address should be complete and include an email address. Please include an abstract, a subject classification conforming to AMS 2000 Mathematics Subject Classification (MSC2000) <http://www.ams.org/msc/>, and a keywords section as above. Page headings should be as above, with an abbreviated title consisting of no more than 50 characters.

Always run the *final version* of your text through a spell checker. BIT prefers but does not insist on American English spelling. Note that the BIT uses 10pt fonts and a page size of 12.1 times 18.9 cm. Check that your displayed formulas,

*Received July 1997. Revised June 2003. Communicated by Axel Ruhe.

†This work was partially supported by a grant from Super Foundation.

tables and figures fits using this text-width! It can be very time-consuming if e.g., formulas have to be split on several lines at a later stage.

3 Mathematics.

Equations are entered as usual. Note that equation numbers are put to the *left* and numbering within sections is used. Always use labels to reference equations, e.g., Equation (\ref{eq3.1}).

To get correct spacings in displayed formulas use the `\quad` and `\qquad` commands. For detailed advice please refer to Higham [?, Section 13.2]. This book is an excellent guide to good mathematical writing.

3.1 Example of theorem.

Five “theorem-like” environments are defined: *theorem*, *lemma*, *corollary*, *proposition*, *definition*.

This is an example what a theorem could look like, taken from a BIT paper by E. Hairer [?]. Note that there is a proof environment as well.

THEOREM 3.1. *If (1.1) is ρ -reversible with an orthogonal matrix ρ , i.e., $f(\rho y) = -\rho f(y)$ for $y \in \mathbf{R}^n$, and if $g(\rho y) = \sigma g(y)$ with some invertible matrix σ and for $y \in \mathbf{R}^n$, then it holds that*

$$(3.1) \quad f_j(\rho y) = -\rho f_j(y) \quad \text{for } y \in \mathbf{R}^n \text{ and for all } j,$$

and therefore the modified differential equation (3.2) is also ρ -reversible.

PROOF. For numerical methods satisfying $\Phi_{-h}(\rho y) = \rho \Phi_h(y)$, their symmetry is necessary and sufficient for the modified equation being ρ -reversible. Without having formulated it explicitly, we assume that $\hat{\Phi}_h$ satisfies this relation (this is trivially true for all Runge–Kutta methods). Differentiating $g(\rho y) = \sigma g(y)$, we get $\rho^T G^T(\rho y) = G^T(y) \sigma^T$ and, due to the orthogonality of ρ , we see that (2.1) is equivalent to

$$\rho \hat{y}_0 = \rho y_0 + G^T(\rho y_0) \sigma^{-T} \mu, \quad g(\rho y_0) = 0.$$

This, together with a similar relation for (2.3), implies $\Phi_{-h}(\rho y) = \rho \Phi_h(y)$ for the symmetric projection method. \square

3.2 Example of remark.

REMARK 3.1. Also defined are environments for *remark*, *example*, *algorithm*, and *problem*. These are all numbered within sections and should be in roman style. Note that this style has to be specified as done below.

```
\begin{example}
{\rm This is an example of an example.}
\end{example}
```

giving the output

EXAMPLE 3.1. This is an example of an example.

4 Figures and tables.

Figures should be in postscript that can be encapsulated within the \LaTeX file. Figures can, for example, be included as follows. You need to have the file `epsf.tex` and include it by writing “input epsf” at the start of your program. To include the figure in the file `myfigure.eps` you write

```
\begin{figure}[htb]
\centerline{\epsfxsize=9cm\mbox{\epsfbox{myfigure.eps}}}
\caption{Results from numerical calculations.}
\label{fig:points}
\end{figure}
```

Another more flexible way to include figures uses `epsfig.sty`, which can be included as argument in `usepackage` (see above). Then you write, e.g.,

```
\epsfig{file=myfigure.eps,height=2in,width=0.80\textwidth}
```

Figure 4.1: Results from numerical calculations.

BIT figures have their captions below the table contents, while tables have captions above the contents. Place the caption command accordingly!

Table 4.1: Errors in the numerical solutions at $t = 30$ by two different methods.

h	$E_2(h)$	$E_2(2h)/E_2(h)$	$E_4(h)$	$E_4(2h)/E_4(h)$
1/2	2.94×10^{-3}	—	4.82×10^{-5}	—
1/4	7.24×10^{-4}	4.058	2.97×10^{-6}	16.267
1/8	1.80×10^{-4}	4.014	1.85×10^{-7}	16.065
1/16	4.50×10^{-5}	4.004	1.15×10^{-8}	16.016
1/32	1.13×10^{-5}	4.002	7.20×10^{-10}	16.004
1/64	2.81×10^{-6}	4.003	4.50×10^{-11}	15.999
1/128	7.01×10^{-7}	4.012	2.82×10^{-12}	15.949

5 BIT bibliographies.

The bibliography style uses numeric labels. The title should be in italics, lower case for article and report titles, mixed upper-lower case for book titles as shown below. The bit style uses alphabetic order. Abbreviations of journals and serials should be used; see the list giving the form of references used in *Mathematical Reviews*. Author names should start with initials. The bibliography below shows how to cite an article, an article in proceedings (or collection), a book, a Ph.D.

thesis and a technical report. If you use \LaTeX you should use the bibliography style *siam*. Include your bbl files in the paper as done here, so that you only need to send one file.

Acknowledgement.

Preliminary versions of the BIT style file were prepared by Hans Riesel and Axel Ruhe.

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