



Sample article for Modeling, Identification and Control based on pdfLaTeX

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Abstract

This article contains a sample article file for Modeling, Identification and Control, based on the class file `micart.cls`. The article contains hints on how to produce articles on PDF format including vector graphics using pdfLaTeX.

Keywords: Choose three to five representative keywords

1 Introduction

This is a sample article file for Modeling, Identification and Control, illustrating the use of the class file `micart.cls`. This class file is built upon the class file `scrartcl.cls` from the KOMA-script bundle, which replaces the standard latex classes (article, book, report), being inspired by european typographical standards.

The traditional L^AT_EX compiler generates a Postscript file and all figures used in the article must be saved as Encapsulated Postscript. To generate the final PDF file, a Postscript to PDF converter is needed.

pdfLaTeX is a variant of the L^AT_EX family of compilers which generates an output file directly to the PDF format. By using pdfLaTeX the final conversion step from Postscript is avoided. pdfLaTeX can import many different types of image files, such as JPG, PNG and PDF. However, the formats JPG and PNG store images as bitmaps, and the quality of the images are lower compared to vector graphics and the file size is also normally larger. MIC strives to keep the PDF file size as low as possible and the figure quality as high as possible, hence using figures with vector graphics is

strongly encouraged. From May 2009, MIC is again available in printed versions. To produce the printed version, the page size is reduced from A4 by about 20%. Hence, to get the best quality in the printed version, the use of vector graphics is strongly recommended.

Many programs can generate figures on vector graphics format. The most common example is Matlab and the command 'print -deps'. The print command works for 2D and 3D plots as well as Simulink block diagrams. One excellent drawing program for L^AT_EX is WinFig (or XFig), which can save vector graphic figures both as Encapsulated Postscript or directly as native L^AT_EX figures. The latter approach also allows L^AT_EX equations to be used inside the figures. Another option to generate vector graphics is to use Microsoft Visio or Microsoft Powerpoint by saving to the Windows Metafile format EMF.

To use vector graphics generated as Encapsulated Postscript directly with pdfLaTeX, these figures must first be converted to vector graphics PDF figures. This conversion can be made using Ghostview (File - Convert - pdfwrite). Otherwise, the PDF figures are imported into pdfLaTeX using the `\includegraphics` command in exactly the same way as EPS files us-

ing the traditional L^AT_EX compiler. The EMF format can be converted to EPS (for example by the freeware EMF2EPS by Dirk Struve, 1999) and finally to vector graphic PDF by Ghostview. To crop graphics from EPS files, it may be necessary to first perform 'PS to EPS' in Ghostview followed by 'Media - User Defined (Width and Height)' and finally 'File - Convert - pdfwrite - Properties - Page Offsets'.

Another advantage of using pdfL^AT_EX compared to the traditional L^AT_EX compiler, is the added options of the href package. The href information must be supplied before `\begin{document}` and could look as follows:

```
\usepackage{hyperref}

\hypersetup{
pdfauthor={G. Hovland},
pdftitle={Sample article for MIC},
pdfkeywords={MIC,pdflatex,vector graphics},
pdfsubject={MIC Journal Article},
colorlinks=true,
pdfstartview=Fit,
pdfpagelayout=SinglePage,
pdfcreator=pdflatex,
pdfproducer=pdflatex}
```

In Acrobat Reader, when selecting 'File - Properties' or (CTRL-D), the hypersetup information will appear. The hypersetup information is also used by popular search engines to index your article. Hence, adding this information is important for an online PDF article.

2 The DOI system

The following text can be found at www.doi.org: A DOI name - a digital identifier for any object of intellectual property. A DOI name provides a means of persistently identifying a piece of intellectual property on a digital network and associating it with related current data in a structured extensible way.

If you have ever tried to follow an URL in an article older than 5-10 years, more often than not you will find that the URL is no longer active. The DOI system is an attempt to overcome this deficiency by providing stable and permanent references for intellectual property on the web.

MIC will be implementing the DOI system during 2009 for every single article published in MIC during the period 1980-2009. The DOI prefix for MIC is

10.4173 and an individual article will be assigned a DOI on the following format: 10.4173/mic.year.no.paperno. For example, the first article published in MIC, [Hallingstad \(1980\)](#), has the following DOI: 10.4173/mic.1980.1.1 and the following permanent URL: <http://dx.doi.org/10.4173/mic.1980.1.1>.

The class file micart.cls has been extended with a new command `MICdoi` which adds the doi information to the bottom left corner of the article including a link to the permanent URL using the href package.

3 Figures and tables

Figures should be included in PDF format and bitmap formats such as JPG and PNG should be avoided when possible. Of course, photos and scans can not easily be converted to vector graphics and should be included as JPG or PNG files. For best possible printing quality, the JPG or PNG files should preferably contain at least 300 DPI (dots-per-inch). Preferably, include-graphics from the graphicx-package should be used. Figure captions should appear below the figure. Figures (and tables) should be referenced this way, Figure 1.

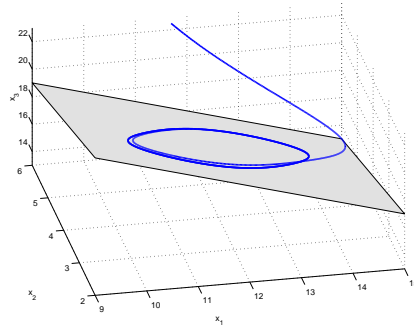


Figure 1: Test figure

For two-column figures or tables, use the star-form of the figure/table environment (such as Table 1). Often, the double column floats can be used in conjunction with the subfig package.

Table captions should appear above the table. For better typographical appearance, avoid vertical lines in the table. Table 1 shows an example made using the package booktabs.

$$\tilde{V}(x(\infty), \eta(\infty)) - \tilde{V}(x(t_i), \eta(t_i)) \leq - \int_{t_i}^{\infty} F(x(\tau), u(\tau; \hat{x}_0)) d\tau - \int_{t_i}^{\infty} \kappa \|\eta(\tau)\| d\tau. \quad (2)$$

Table 1: Test table

Initial condition	Cost				
	Algorithm 1	Algorithm 2	Algorithm 3	Algorithm 4	Algorithm 5 The best one
(-4,0)	832.72	831.72	677.89	609.44	609.39
(-2,.6)	378.24	374.57	234.63	204.46	204.46

4 Mathematics and equations

For mathematics, use the packacke `amsmath` (and `amsymb`). Use the `align`-environment from `amsmath` instead of `eqnarray`,

$$\begin{aligned} f(x) &= e^{-x}, \\ g(y) &= \sin^{-1} y. \end{aligned} \quad (1)$$

Note the punctuation. It is also preferable to use the `align`-environment for one-line equations, instead of the `equation`-environment.

Number those equations which are referred to, such as (1).

One should try to avoid equations that are wider than one column. If unavoidable, use a float as explained in the `IEEEtran`¹ documentation, and place it on the bottom of a page (use the package `stfloats`). See (2) (bottom of page).

The equation numbering should still be consecutive, see (3). Note that `amsmath` constructs such as the `multline` environment can be used to avoid too wide equations,

$$\begin{aligned} &\tilde{V}(x(\infty), \eta(\infty)) - \tilde{V}(x(t_i), \eta(t_i)) \\ &\leq - \int_{t_i}^{\infty} F(x(\tau), u(\tau; \hat{x}_0)) d\tau - \int_{t_i}^{\infty} \kappa \|\eta(\tau)\| d\tau. \end{aligned} \quad (3)$$

5 Citations

You should use Harvard reference style, for example using the bibliography style file `mic.bst`. Using the package `natbib`, cite either in text as shown in Hovd and Braatz (2004) (using the `\citep`-command), or in parantheses (Hovd and Skogestad, 1992) (using the `\citep`-command). These two first citations are journal and conference citations, one can also have book chapter (Hovd and Skogestad, 2000) or book as in Balchen and Mummé (1988), or other citations.

The file `mic.bst` has been modified to allow DOI information. In the bibliography file `micartsam.bib` the

doi example for Hallingstad (1980) is as follows: doi =

¹Can be found on <http://www.ctan.org/>.

10.4173/mic.1980.1.1. The MIC class files will automatically add the permanent link to this article in the reference list. We strongly encourage the use of DOI in the bibliography instead of URL addresses, whenever possible.

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Add, if desired, appropriate acknowledgments here (for example, financing or any other help).

References

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