A Model for Writing Reports in Latex

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Contents

1 The title page

This was done as

```
\documentclass[12pt,a4paper]{article}
\pagestyle{myheadings}\markright{Computational Physics}
\input psfig.sty

\usepackage{graphicx}
% ------Personal LaTeX Macros---------

\newcommand{\p}{\partial}
\newcommand{\refs}{\par \noindent}
\newcommand{\sech}{\mbox{sech}}
\newcommand{\pra}{Phys. Rev. A }
\newcommand{\prd}{Phys. Rev. D }
\newcommand{\oc}{Opt. Commun. }
\newcommand{\pr}{Phys. Rev. }



\title{A Model for Writing Reports in Latex}
\author{M.~K. Olsen}
\date{\today}
%

\begin{document}

\maketitle

\tableofcontents

\newpage

\section{The title page}
This was done as
```

2 Getting started

There are several text editors that can be used with Latex, such as emacs and kwrite. I use kwrite, which can be opened by typing

```
kwrite &
```

in your terminal. This will open a file which you can save as

```
myfile.tex
```

and typeset using the command

```
latex myfile.tex
```

This produces a dvi file which can be printed or converted to ps or pdf.

Latex is very versatile and can do some completely useless things, such as: ♡ **aaaa**$\mathbf{a}_{\mathbf{a}_{\mathbf{r}_{\mathbf{g}}}}$ **h** which will hopefully not be needed in this course.

It is more useful for writing equations, such as

$$\frac{dy}{dt} = y, \qquad y(0) = 1. \tag{1}$$

The equation can then be referred to as Eq. 1.

Figures can be inserted in the text: and referred to as Fig. 1, for example.

These things were done as

```
Latex is very versatile and can do some completely useless things, such as:
$\heartsuit$ \raisebox{0pt}[0pt]{\Large%
\textbf{aaaa\raisebox{-0.3ex}{a}%
\raisebox{-0.7ex}{a}%
\raisebox{-1.2ex}{r}%
\raisebox{-2.2ex}{g}%
\raisebox{-4.5ex}{h}}}
which will hopefully not be needed in this course.

It is more useful for writing equations, such as
\begin{equation}
\frac{dy}{dt}=y,\hspace{2cm} y(0)=1.
\label{eq:equation1}
\end{equation}
The equation can then be referred to as Eq.~\ref{eq:equation1}.
```

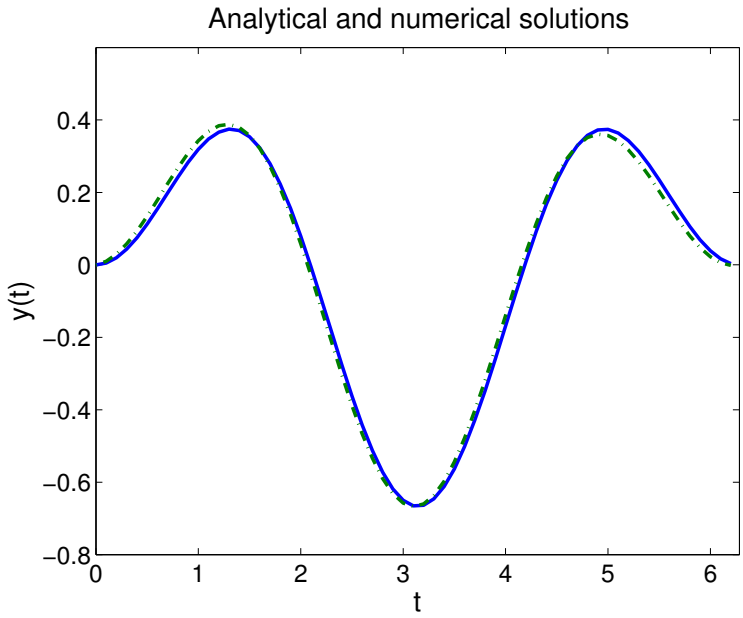

Figure 1: A graphic made in Matlab and exported as an eps file.

```
Figures can be inserted in the text:
\begin{figure}[tbhp]
\begin{center}\includegraphics[width=0.8\columnwidth]{spring.eps}
\end{center}
\caption{A graphic made in Matlab and exported as an eps file.}
\label{fig:spring}
\end{figure}
and referred to as Fig.~\ref{fig:spring}, for example.
```

2.1 References

You may wish to reference works such as some by your lecturer [1] and other scientists that some of you may have heard of [2]. This is easily done.

```
You may wish to reference works such as some by your
lecturer~\cite{k2dimer} and other scientists that
some of you may have heard of~\cite{EPR}. This is easily done.
```

3 Equations

Systems of equations are written as follows:

$$\begin{aligned} \frac{dx}{dt} &= -4y + \cos t, \\ \frac{dy}{dt} &= x, \end{aligned} \tag{2}$$

with matrix equations also being possible:

$$A_1 = \begin{bmatrix} -\gamma_1 & 0 & 0 & \chi_1\beta_1^{ss} & 0 & 0 \\ 0 & -\gamma_1 & \chi_1(\beta_1^*)^{ss} & 0 & 0 & 0 \\ 0 & \chi_1\beta_1^{ss} & -\gamma_2 & 0 & -\chi_2(\beta_2^*)^{ss} & 0 \\ \chi_1(\beta_1^*)^{ss} & 0 & 0 & -\gamma_2 & 0 & -\chi_2\beta_2^{ss} \\ 0 & 0 & \chi_2\beta_2^{ss} & 0 & -\gamma_3 & 0 \\ 0 & 0 & 0 & \chi_2(\beta_2^*)^{ss} & 0 & -\gamma_3 \\ -\chi_1\alpha_2^{ss} & 0 & -\chi_1\alpha_1 & 0 & 0 & 0 \\ 0 & -\chi_1(\alpha_2^*)^{ss} & 0 & -\chi_1(\alpha_1^*)^{ss} & 0 & 0 \\ 0 & 0 & -\chi_2(\alpha_3^*)^{ss} & 0 & 0 & -\chi_2\alpha_2^{ss} \\ 0 & 0 & 0 & -\chi_2\alpha_3^{ss} & -\chi_2(\alpha_2^*)^{ss} & 0 \end{bmatrix}. \tag{3}$$

```
Systems of equations are written as follows:
\begin{eqnarray}
\frac{dx}{dt} &=& -4y+\cos t,\nonumber\\
%
\frac{dy}{dt} &=& x,
\label{eq:mola}
\end{eqnarray}
with matrix equations also being possible:
\begin{equation}
A_{1}=\left[\begin{array}{cccccc}
-\gamma_{1} & 0 & 0
& \chi_{1}\beta_{1}^{ss} & 0 & 0 \\
%
0 & -\gamma_{1} & \chi_{1}(\beta_{1}^{\ast})^{ss}
& 0 & 0 & 0 \\
%
0 & \chi_{1}\beta_{1}^{ss} & -\gamma_{2}
& 0 & -\chi_{2}(\beta_{2}^{\ast})^{ss} & 0 \\
%
0 & \chi_{1}\beta_{1}^{ss} & -\gamma_{2}
& 0 & -\chi_{2}(\beta_{2}^{\ast})^{ss} & 0 \\
%
```

```
\chi_{1}(\beta_{1}^{\ast})^{ss} & 0  & 0
& -\gamma_{2} & 0 & -\chi_{2}\beta_{2}^{ss} \\
%
0 & 0 & \chi_{2}\beta_{2}^{ss} & 0
& -\gamma_{3} & 0 \\
%
0 & 0 & 0 & \chi_{2}(\beta_{2}^{\ast})^{ss}
& 0 & -\gamma_{3}\\
%
-\chi_{1}\alpha_{2}^{ss} & 0 & -\chi_{1}\alpha_{1}
& 0 & 0 & 0\\
0 & -\chi_{1}(\alpha_{2}^{\ast})^{ss} & 0
& -\chi_{1}(\alpha_{1}^{\ast})^{ss} & 0 & 0 \\
%
0 & 0 & -\chi_{2}(\alpha_{3}^{\ast})^{ss}
& 0 & 0 & -\chi_{2}\alpha_{2}^{ss} \\
%
0 & 0 & 0 & -\chi_{2}\alpha_{3}^{ss}
& -\chi_{2}(\alpha_{2}^{\ast})^{ss} & 0
\end{array}\right].
\label{eq:Amatmilan1}
\end{equation}
```

4 Lists

Lists are relatively simple:

1. Submit your project diary. **(5)**
2. Provide a listing of your working program as well as the address of a working version in your computer account which you must keep available for me to check if necessary. **(3)**
3. For the initial conditions of: distance from the Earth centre of $6800km$, velocity $10.75km\,s^{-1}$, and initial direction 50 degrees, use your program to calculate the corresponding values of the polar position coordinates r, ϕ and polar momentum coordinates p_r, p_ϕ. **(3)**

```
Lists are relatively simple:
\begin{enumerate}

\parskip 0pt
```

```
\parsep 0pt
\itemsep 0pt
\item Submit your project diary. {\bf (5)}

\item Provide a listing of your working program as well as the address
of a working version in your computer account which you must keep
available for me to check if necessary. {\bf (3)}

\item For the initial conditions of: distance from the Earth centre of
$6800km$, velocity $10.75km\,s^{-1}$, and initial direction 50
degrees, use your program to calculate the corresponding values of the
polar position coordinates $r,\phi$ and polar momentum coordinates
$p_r,p_{\phi}$. {\bf (3)}
```

5 Conclusion

That should be enough to get started. There is a lot of online help for Latex.

The bibliography is done as:

```
\begin{thebibliography}{9}

\bibitem{k2dimer}M.~K. Olsen, P.~D. Drummond, \pra, 71, 53803 (2005).

\bibitem{EPR}A. Einstein, B. Podolsky, and N. Rosen, \pr \textbf{47}, 777, (1935

\end{thebibliography}




\end{document}
```

References

[1] M. K. Olsen, P. D. Drummond, Phys. Rev. A , 71, 53803 (2005).

[2] A. Einstein, B. Podolsky, and N. Rosen, Phys. Rev. **47**, 777, (1935).