Sample of Manuscript in LaTeX

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Abstract

This is a sample of the way a completed manuscript for a Math 333 paper (or the FYP report) should look. This sample contains the major section headings of a typical paper, as well as illustrates the figure inclusion utilities of the LaTeX macros. In the Abstract, what you need to do is to summarize the paper. In some sense, this is the most difficult part of the paper.

1 Introduction

In this section, you should introduce your work by explaining what physical problem you are considering and why it is of interest. In other words, this section should motivate the rest of the paper (and should motivate the reader to read further).

2 Governing equations

You may want to have a section like this to display the mathematical model which you are considering, and to define all the parameters of your problem. Equations are written in LaTeX format. For instance, the forced pendulum equation appears as in [1].

$$\ddot{\theta} + \frac{1}{q}\dot{\theta} + \sin\theta = g\cos\omega_D t\,. \tag{1}$$

This may be written as a system of coupled first-order equations:

$$\begin{aligned} \dot{\theta} &= u\,, & (2)\\ \dot{u} &= -\frac{1}{q}u - \sin\theta + g\cos\phi\,, \\ \dot{\phi} &= \omega_D\,. & (3) \end{aligned}$$

Once you get the hang of typing in LaTeX it becomes fairly easy. Once and a while you need to type something you haven't done before, and then you need to reference the LaTeXbook [2], or ask a more knowledgeable classmate or tutor.

Note how I have been referencing other works. You may find the full references at the end of the paper. Plagiarism (the copying of the writings of another author so that it appears to be your own original work) will not be tolerated in this class. Any paper which contains copied material without citation will automatically receive a low grade.

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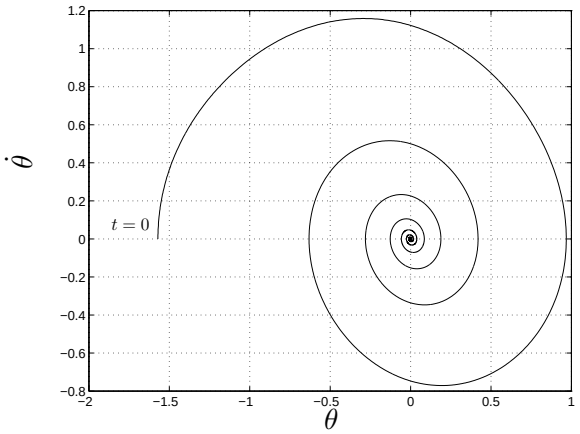

Figure 1: Example of the phase-space evolution of an underdamped pendulum.

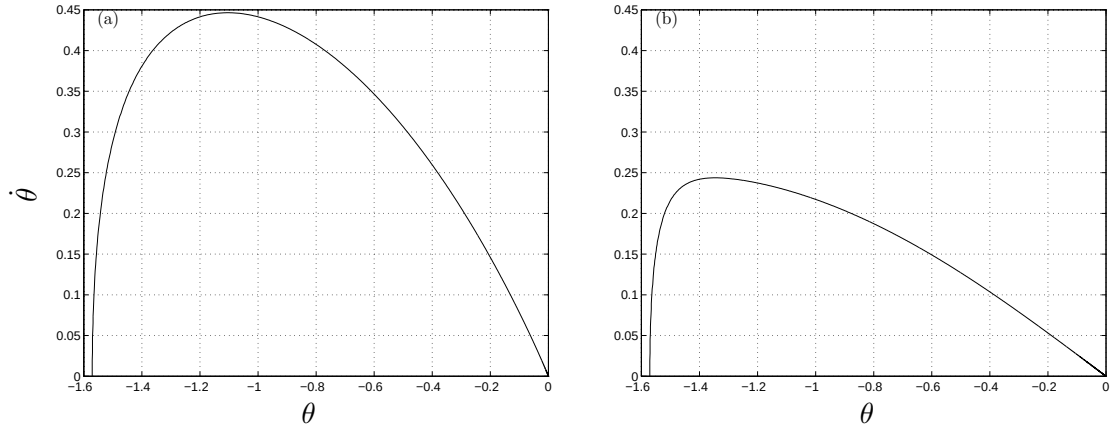

Figure 2: When placing figures side-by-side like this, be sure that text in the figure is large enough to be legible.

3 Numerical Methods

If your numerical methods are novel, you may want a section such as this which provides details to the reader. If your methods are standard, this section may be omitted. If your work is more analytical, you may entitle this section **Analytical Methods** instead.

4 Results

This is the main body of your paper. Here, you present your numerical and/or analytical results and the figures which illustrate them. To show you how to use the figure inclusion macros, I present in Figure 1 the phase space diagram of an underdamped pendulum. To produce Figure 1, Eq. **??** has been solved with $q = 4$, and $g = 0$. Initial conditions are such that at $t = 0$, the pendulum is at rest with $\theta = \pi/2$.

It is also possible to put two or more figures side-by-side. Suppose we wanted to display Figs. 2a–2b to demonstrate the difference in the phase portraits of a critically damped and overdamped pendulum ($q = 1/2,$ and 1, respectively). You may look at the LaTeX to see how this is done.

5 Conclusions

Here you discuss what you have learned from this work, and what the reader should have learned from your paper.

Acknowledgments

If there are some colleagues in or outside the class that you have discussed this work with, you may want to acknowledge these discussions here. Alternatively, if one of the TA's helped you extensively with your paper, this may be a good place to thank them. Here, I would like to thank Wai-wa Fung for his help in setting up this LaTeX macro.

References

[1] G. L. Baker, & J. P. Gollub, *Chaotic Dynamics*, Cambridge University Press, 1990.

[2] L. Lamport, *LaTeX: A document preparation system*, Addison Wesley Publishing Company, 1994.