The Dynamics of Some Sort of Interesting System

Michael Shell, *Member, IEEE,* John Doe, *Fellow, OSA,* and Jane Doe, *Life Fellow, IEEE*

***Abstract*—The abstract goes here.**

***Index Terms*—IEEEtran, journal, LaTeX, paper, template, AER 540.**

I. Introduction

THIS demo file is intended to serve as a "starter file" for IEEE journal papers produced under LaTeX using IEEEtran.cls version 1.8 and later. I wish you the best of success.

mds
December 27, 2012

Prof. Forbes has modified the template slightly. He's added in some custom commands, shown below, so students use the proper notation.

Here's some reference, such as the book [1] and a paper [2]. It is recommend that you use bibtex. Remember, when compiling you must compile in the following order: "latex bibtex latex latex".

A. Figures

This is how you include a figure. See Figure 1.

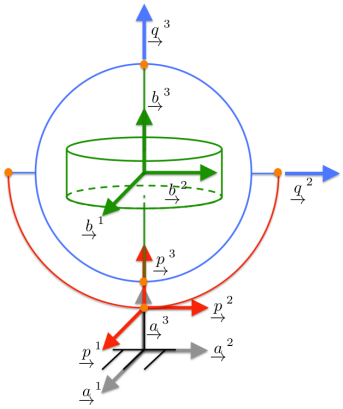

Fig. 1. This is a gimbal. Make sure your figure captions are descriptive.

B. Custom Latex Commands for AER 540

A physical vector is an element of physical space:

$$\underrightarrow{r} \in \mathbb{P}. \tag{1}$$

M. Shell is with the Department of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA, 30332 USA e-mail: (see http://www.michaelshell.org/contact.html).

J. Doe and J. Doe are with Anonymous University.

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The physical vector $\underrightarrow{r}$ given in (1) can be resolved in any frame, say $\mathcal{F}_a$, as follows:

$$\underrightarrow{r} = \underrightarrow{\boldsymbol{\mathcal{F}}}_a^{\mathsf{T}} \mathbf{r}_a.$$

Students, please notice how to use "\beq" and "\eeq" along with "\label" both number an equation, and then reference that equation using "\eqref". If you do not need an equation number, then use "\bdis" and "\edis".

The Transport Theorem is

$$\underrightarrow{r}^{pq}{}^{\bullet a} = \underrightarrow{r}^{pq}{}^{\bullet b} + \underrightarrow{\omega}^{ba} \times \underrightarrow{r}^{pq}$$

In $\mathcal{F}_b$ the second term is

$$\boldsymbol{\omega}_b^{ba\times} \mathbf{r}_b^{pq}.$$

Use "\mbf" and "\mbs" properly. Also, use "$(\cdot)^{\times}$" properly. The acceleration of point p relative to point q with respect to $\mathcal{F}_a$ is

$$\underrightarrow{r}^{pq}{}^{\bullet\bullet a},$$

and the acceleration of point p relative to point q with respect to $\mathcal{F}_b$ is

$$\underrightarrow{r}^{pq}{}^{\bullet\bullet b}.$$

The column matrix $\mathbf{r}_a$ can be written as

$$\begin{aligned} \mathbf{r}_a &= \begin{bmatrix} r_{a,1} \\ r_{a,2} \\ r_{a,3} \end{bmatrix} \\ &= r_{a,1} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} + r_{a,2} \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} + r_{a,3} \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}. \end{aligned}$$

A general matrix can be written as

$$\mathbf{A} = \begin{bmatrix} 1 & 2 \\ 4 & 9 \end{bmatrix}.$$

A matrix of matrices can also be written:

$$\mathbf{P} = \begin{bmatrix} \mathbf{A} & \mathbf{B} & \mathbf{C} \\ \mathbf{D} & \mathbf{E} & \mathbf{F} \\ \mathbf{G} & \mathbf{H} & \mathbf{I} \end{bmatrix}.$$

You can refer to previous sections, such as Section I-A.

A matrix differential equation is

$$\mathbf{M}\ddot{\mathbf{q}} + \mathbf{K}\mathbf{q} = \mathbf{0}.$$

C. Lists

We can write numbered lists:

1) This is an item.
2) This is another item.

1) Subsubsection Heading Here: Subsubsection text here.

II. Conclusion

The conclusion goes here.

Appendix A
Proof of the First Zonklar Equation

Appendix one text goes here.

Appendix B

Appendix two text goes here.

Acknowledgment

The authors would like to thank...

References

[1] G. M. T. D'Eleutario and G. R. Heppler, *Newton's Second Law And All That (Preprint)*. Cambridge University Press, 2014.
[2] M. D. Schuster and S. D. Oh, "Three-Axis Attitude Determination from Vector Observations," *AIAA Journal of Guidance and Control*, vol. 4, no. 1, pp. 70–77, 1981.

Michael Shell Biography text here.

John Doe Biography text here.

Jane Doe Biography text here.