How to Start Writing an LSST DESC Paper

The LSST Dark Energy Science Collaboration[0]

We describe the `start_paper` project, including the cookiecutter mechanism and various paper and LSST DESC Note templates. A PDF version of the paper is compiled at travis-ci every time the GitHub repo is updated, with the output being deployed either to a remote "pdf" or "drafts" branch.

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Introduction

This is a paper and note template for the LSST DESC (Ivezic et al. 2008; LSST Science Collaboration 2009; LSST Dark Energy Science Collaboration 2012). You can delete all this tutorial text whenever you like.

Eventually it will be possible to switch between various LaTeX styles for internal notes and peer reviewed journals templates. The base switch is between `aastex.cls` and `revtex.cls`; however, facilities are also provided for `emulateapj.cls` and `mnras.cls`.[1] Documents can be compiled using the provided `Makefile` with several options: `make apj`, `make apjl`, `make prd`, and `make mnras`. There are some oddities when changing between templates, so please be patient while we try to work these out.

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[1] The `mnras.cls` class file is a bit odd...

Table 1. Example table.

Column 1	Column 2	Column 3	Column 4
	deg	kpc	deg
Obj1	(0,0)	10	0.1
...	...	...	...
ObjN	(0,0)	10	0.1

Commands

There are a number of useful LATEX commands predefined in `macros.tex`. Notice that the section labels are prefixed with `sec:` to allow the use of the `\secref` command to reference a section (i.e., Section 1). Figures can be referenced with the `\figref` command, which assumes that the figure label is prefixed with `fig:`. In Figure 1 we show an example figure. You'll notice that the actual figure file is found in the `figures` directory. However, because we have specified this directory in our `\graphicspath` we do not need to explicitly specify the path to the image.

The `macros.tex` package also contains some conventional scientific units like Å, GeV, $M_\odot$, etc. and some editorial tools for highlighting **issues**, **text to be checked**, *comments*, and new additions.

Methods

Similar to the figure before, here we have included a table of data from `tables/table.tex`. Notice that again we are able to reference Table 1 with the `\tabref` command using the `tab:` prefix. Also notice that we haven't needed to specify the full path to the table because in the `Makefile` we include `./tables` directory in the `$TEXINPUTS` environment variable.

Equations appear as follows, and can be referred to as, for example, Equation 1 – just as for tables, we use the `\eqnref` command using the `eqn:` prefix.

$$\langle f(k) \rangle = \frac{\sum_{t=0}^{N} f(t,k)}{N} \tag{1}$$

Results

Figure 1. An example figure: the LSST DESC logo, copied from `.logos/desc-logo.png` into `figures/example.png`.

Figure 1 shows an example figure, referred to with the `\figref` command and the `fig:` prefix.

Discussion

If you are planning on committing your paper to GitHub, it's a good idea to write your tex as one sentence per line. This allows for an easier `diff` of changes. It also makes sense to think of latex as *code*, and sentences as logical statements, occupying one line each. Each line must "compile" in the mind of the reader.

Conclusions

Here's a summary of what we just reported.

We can draw the following well-organized and neatly-formatted conclusions:

- This is important.

- We can measure some number with some precision.

- This has some implications.

Here are some parting thoughts.

Acknowledgments

Here is where you should add your specific acknowledgments, remembering that some standard thanks will be added via the `acknowledgments.tex` file.

This is the text imported from `acknowledgments.tex`, and will be replaced by some standard LSST DESC boilerplate at some point.

References

Ivezic, Z., Tyson, J. A., et al. 2008, ArXiv e-prints, arXiv:0805.2366

LSST Dark Energy Science Collaboration. 2012, ArXiv e-prints, arXiv:1211.0310

LSST Science Collaboration. 2009, ArXiv e-prints, arXiv:0912.0201