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* Introduction

<https://link.springer.com/article/10.1007/s10569-022-10094-4>

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Plots

MBA asteroids plot

Parallax angle plot

Gaia image star catalogue

Residual Plot

DeltaP/P plot x5

Table for the definitions of orbital parameters or diagram

Error on orbital parameters plot?

Jacknifing plots

Orbits plot \*\*\*

Observational logs

Table of the orbital parameters used in the ideal plot

Monte carlo plot

Table oRbital elements vs JPL results w percentage difference w plot showing the standard error w each orbital parameter one over the other

Either same objects vs orbital paramteers or same parameters vs objects

Table of orbital element, jpl value, jack knife value, spread

Plot of year vs standard error/ arcsec

Graph of dec vs RA, what happens in sky over time for all asteroids on all days w individual graphs for each path r

Residual graph, 6 obs to 14obs show factor of improvement by increasing no of obs to show we’ve done enough

Residual of range, eg 50 days residual over 2 weeks

Plot of Differneces in position for one object for JPL vs our result

Plot of observing log in appendix

Are they accurately determined and consistent with jPL

Outline



Monte carlo method

* Can be used to calculate impact probability
* <https://machinelearningmastery.com/monte-carlo-sampling-for-probability/#:~:text=We%20can%20make%20Monte%20Carlo,random%20samples%20from%20this%20distribution>.
* <https://www.investopedia.com/terms/m/montecarlosimulation.asp#:~:text=a%20given%20trajectory.-,Monte%20Carlo%20Simulation%20Results%20Explained,will%20be%20higher%20or%20lower>.
* https://www.researchgate.net/publication/354626767\_An\_Improved\_Approach\_to\_Orbital\_Determination\_and\_Prediction\_of\_Near-Earth\_Asteroids\_Computer\_Simulation\_Modeling\_and\_Test\_Measurements

Simulators and skymaps

<https://in-the-sky.org/findercharts.php?objtxt=A895&duration=5>

A couple of latex suggestions as promised. Suggestion 1: use overleaf, it makes it a lot easier ([www.overleaf.com](https://www.overleaf.com)).

For citations, I use the style of whatever journal I’m submitting to. There are styles built in to latex which will probably be easiest (see <https://www.overleaf.com/learn/latex/Bibtex_bibliography_styles>, <https://www.overleaf.com/learn/latex/Natbib_citation_styles>). If you want a real journal template, MNRAS is a good example and you can use their files. The full paper template is here (<https://www.overleaf.com/latex/templates/monthly-notices-of-the-royal-astronomical-society-mnras-latex-template-and-guide-for-authors/kqnjzrwjwjth>) but if you just want the citation bit then copy the “mnras.bst” file over to your project and add the following lines to your main document:

At the top, near other usepackage commands:  
\usepackage{natbib}

Where you want your references:  
\bibliographystyle{mnras}  
\bibliography{example} % if your bibtex file is called example.bib

You’ll also need to create another file called “example.bib”, which contains all the information on the papers. There is an example in the MNRAS template I’ve linked above, and you can also get the descriptions for specific papers from their ADS records (for example <https://ui.adsabs.harvard.edu/abs/1671RSPT....6.3075N/exportcitation>).

For making nice links to sections in your report, add \label{mysectionname} to the start of your section, and \ref{mysectionname} where you want the link to be. Also works for figures and tables. There are examples in the MNRAS template.

Good luck with your reports!

Tommy, the summary should be comparable to the ones you’ve written in previous reports but you just have more substance to cover so a 200 word limit would be a challenge but one page gives you more than enough acreage to put 300-350 words in. Good luck with the writing!

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