

# The Fisher4Cast

## Version 2.2

### Quick Start Guide

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## I. QUICK START GUIDE TO FISHER4CAST VERSION 2.2

### A. Introduction

Fisher4Cast was developed with the aim of providing the community with a free, standard and tested tool for Fisher Matrix analysis, that is both easy to use through the Graphical User Interface, and yet also a robust general base-code for research. Here we provide a very brief Quickstart guide. For more complete guidelines to the code please see the manual (Users\_Manual.pdf). The code and its scientific application are also discussed in [3].

### B. Hardware and software requirements

This software is written to be run in Matlab (Linux, Windows and under Mac OSX, although this has not been extensively tested). The user needs Matlab installed (Tested on Version 7) to be able to run this code. Free disk space of approximately 2MB and the minimum recommended processor and memory specifications required by the Matlab version you are using is suggested.

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### C. Downloading Fisher4Cast

Currently the code is available at [1] or [2]. Save this .zip file into the directory you want to run the Fisher4Cast suite from.

### D. Getting started

The code can be run from the command line or the Graphical User Interface (GUI). We describe the command line below, and mention how to get the GUI started. For more information on the GUI, please see the manual.

### E. The Graphical User Interface

- Running the GUI

The GUI can be started from the Matlab editor. The file **FM\_GUI.m** must be opened from the directory, and once the file is opened (click on the file icon from within the Command-line interface to open it with an editor) press F5 to run the code. This will open up the GUI screen. You can also launch the GUI from the command line by typing:

You can also launch the GUI from the command line by typing:

```
>>FM_GUI
```

This then functions in the same way as using FM\_run in the command line (as explained in the following section).

For more information on the technicalities of the GUI, see the full manual.

- GUI Screenshots

We include some screenshots of the Graphical User Interface.

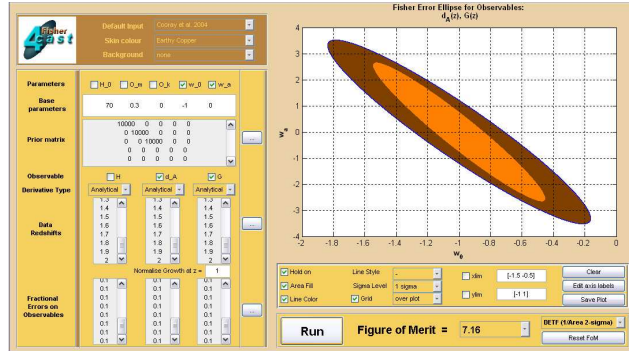


FIG. 1: **Plotting multiple ellipses on one axis** - using the 'Hold on' multiple error ellipses can be overlaid on one axis. The 'Area Fill' command allows you to choose the colours for the error ellipses. Also shown is the 'Running' window which indicates the code is running to calculate the Fisher ellipses.

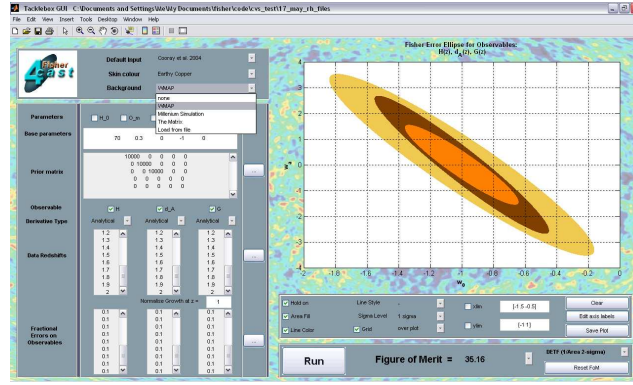


FIG. 2: **Different background images and colour schemes** - the background images and colour schemes (skins) allow for a fully customisable Graphical User Interface.

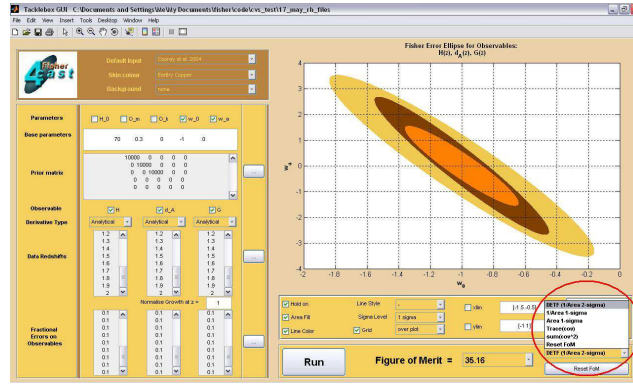


FIG. 3: **Various Figures of Merit can be plotted** - the drop-down list allows for a choice between various Figure of Merit options.

## F. The Command Line

- Running the code

Open your version of Matlab and change the working directory to be the same as where you saved Fisher4Cast in. To run the code from the command line with one of the standard test input structures supplied, type:

```
>>output = FM_run(Cooray_et_al_2004)
```

This will call the code using the pre-supplied test input data (Cooray\_et\_al\_2004) and then generate an error ellipse plot for the parameters and observables supplied in the chosen input. All the relevant generated output is written to the output structure. You can see the range of outputs to access by typing:

```
>>output
```

and then examine each output individually by specifying it exactly. For example:

```
>>output.marginalised_matrix
```

will access the marginalised Fisher matrix from the output structure.

You can use the supplied input files as a template for generating new input files with your own customised parameters and values. All fields shown in the example structures must be filled in any user-defined structure.

The code can also be run from the Matlab editor. Once the code is opened (open it from inside the Matlab window), you can press F5 to run the code. Note that if the code is run from the Editor it will call the default input structure, which is the `Cooray_et_al_2004.m` file. This is an example file containing input data from the paper by Cooray *et al.* [4]. This output can be directly compared to that of Figure 1 of that paper. If your output compares correctly, you have a working installation of the code. Another input available is `Seo_Eisenstein_2003.m` [5].

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- [1] <http://www.cosmology.org.za>.
  - [2] <http://www.mathworks.com/matlabcentral/fileexchange/>.
  - [3] Bruce A. Bassett, Yabebal Fantaye, Renee Hlozek, and Jacques Kotze. Fisher matrix preloaded – fisher4cast. 2009.
  - [4] A. Cooray, D. Huterer, and D. Baumann. Growth rate of large-scale structure as a powerful probe of dark energy. *Phys. Rev. D*, 69(2):027301–+, January 2004.
  - [5] H.-J. Seo and D. J. Eisenstein. Probing Dark Energy with Baryonic Acoustic Oscillations from Future Large Galaxy Redshift Surveys. *ApJ*, 598:720–740, December 2003.