10 Sensitivity studies with GLoBES

Learn to use the software package GLoBES and study the sensitivity of current and future experiments.

Focus: Neutrino oscillations
Requirements: Numerical calculation/GLoBES software
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In planning neutrino oscillation experiments and in analyzing their data, simulations play a crucial role. One of the most powerful software tools for phenomenological studies in neutrino physics is GLoBES, which will be the topic of this tutorial.

Download GLoBES from `http://www.mpi-hd.mpg.de/~globes/` (we recommend to download the latest development version) and install it. GLoBES runs best on Linux machines, but usually works also on Macs, provided that a build environment is available. GLoBES depends on the GNU Scientific Library.

Next, download the GLoBES tutorials from the Documentation section of the webpage. There are four tutorials available:

1. **Simulating T2K.** In this entry-level tutorial, you will learn about the basic features of GLoBES, and you will study the sensitivity of the T2K experiment. (Note that this simulation is based on the T2K Letter of Intent, so results will differ from the performance of the actual T2K experiment.)

2. **AEDL featurea.** In this intermediate level tutorial, you will learn how to implement a new experiment in GLoBES.

3. **Advanced features.** In this advanced tutorial, you will learn how to control the treatment of systematic uncertainties in GLoBES and how to change the way oscillation probabilities are computed (relevant for instance for the implementation of scenarios beyond the Standard Model).

4. **Degeneracy Finding.** A common problem in fitting neutrino oscillation data is that several disjoint regions of parameter space can all give a good fit (for instance normal vs. inverted mass ordering). In this advanced tutorial, you will learn about strategies to make sure a fitting algorithm doesn't miss any of these regions.

Choose a tutorial that matches your interests and previous experience. All tutorials contain GNUPlot scripts for plotting results. Of course, you are welcome to use your own favorite plotting tool instead.