



Hands-on on Bayesian inference

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Hands-on application

You are in contact with a group of experts in measuring the parallax with nearby stars. They need you to exploit their measurements to estimate the distance to the observed star. They are especially interested in quantifying uncertainties. Let's help them out!

In this hands-on project, you will:

- formalize this task as an inference problem
- implement the Metropolis-Hastings algorithm to solve it
- visualise your results and extract estimators
- analyse the effect of the noise variance and of the prior on the final uncertainties on the distance

Necessary packages: In this hands-on session, we will work with python. Please make sure to have the following (standard) packages installed:

- `ipykernel` to run the notebook
- `numpy` and `matplotlib` to answer the different questions

To check your installation, run the first cell of the notebook (with importations). If it runs without any error, you are all set!

If you are not an expert in python, no worries! The goal of this hands-on session is for you to focus on Bayesian inference. I have left some python tips throughout the notebook to indicate which function to use for certain tasks.

Note: for those of you that already master python and Bayesian inference, I indicate at the very end of the notebook a more ambitious tutorial on the beetroots sampler, designed to reconstruct large maps of physical parameters from large multi-spectral images