

ASTRONOMY 598: MONTE CARLO METHODS HOMEWORK 2

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README

This directory contains the code that answers questions 1a, 1b, 2a, and 2b from homework 2 while this document provides additional content for the same questions. Specifically, `run_hw1.py` code implements the Poisson and Gaussian probability distribution functions `poisson` and `gaussian` used to plot $NP(n)$ and $NP(x)$. The script `run_hw2.py` generates the figures for problems 1a,b and 2a,b. To run, enter `python run_hw2.py`.

RUNNING ON HYAK

To run the code on Hyak, follow the instructions given below.

- 1) Create an interactive session by entering `qsub -I -l walltime=hr:min:sec` where `hr = 03` is a safe amount of time
- 2) Find your favorite python distribution (2.7+ for this code) using `module avail`
- 3) Load the python distribution via `module load (name of package found using module avail)`. I recommend loading `anaconda_2.4`.
- 4) Run the script by typing `python run_hw2.py`

PROBLEM 1

The answers to part a and b are given in the accompanying code.

1a. The plot of $NP(n)$ almost exactly matches the histogram of random deviates drawn from the Poisson distribution.

1b. The plot of $NP(n)$ deviates significantly from the histogram of random deviates drawn from the Poisson distribution for several n .

PROBLEM 2

The answers to part a and b are given in the accompanying code.

2a. The plot of $NP(x)$ almost exactly matches the histogram of random deviates drawn from the Gaussian distribution.

2b. The plot of $NP(x)$ deviates significantly from the histogram of random deviates drawn from the Gaussian distribution for several x .