

Seminar (ASTRO 589)

Fall 2019

Problem Set 5

Due on 16 December 2019

Homework is the central part of this course. You are encouraged to collaborate with fellow students and/or to consult senior students, local postdocs and me. But, **please write the cod/solution by yourself**. Homework is strictly due by the beginning of the class on 16 December, and **no late homework will be accepted**.

1. Let's measure the two-point correlation function and power spectrum from the mock data. I simplify the mock just to include the survey geometry, but not the pattern of IFUs. That is, we measure the two-point statistics for the imaginary HETDEX where we observe everything in the survey footprint. You can find the mock galaxy distribution in

http://personal.psu.edu/duj13/ASTRO589/data/Spring_mock_data.h5

and random (synthetic) galaxy distribution in

http://personal.psu.edu/duj13/ASTRO589/data/Spring_mock_random.h5

The random contains roughly 20 times more samples. Using these data,

- (a) Estimate the two-point correlation function as a function of the separation.
- (b) Estimate the power spectrum as a function of the separation.
- (c) Compare the power spectrum with the input power spectrum (mock_HETDEX_Spring_all_pk.txt file in the same folder) and the expected two-point correlation function calculated from the power spectrum. If your answer is different, besides some possible bug in the code, what causes the difference?

- Send me both the graphs and your code as PDFs (djeong@psu.edu).
- Use your favorite programming language in the list below: FORTRAN, C++, Python, IDL, Julia, Mathematica. You may call standard integration routines for FFTW of tree generators, etc.