

Practice 3.

1.-We are going now to practice 2P-statistics in Fourier Space. We will follow the procedure listed in the slides:

- I. Distributing particles onto the regular grid
 - II. Fourier transformation
 - III. Estimating power spectrum
 - IV. Deconvolving window function*
 - V. Subtracting shot noise
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- A) We will use the file 'Halo_list_NO_FOFR_1000.txt' the format is x,y,z,mass. We will use a `grid_size = 10`. for estimating the density using the NGP particle distribution scheme. Determine the min and max of the coordinates to determine the size of the box, you will need those quantities for the density estimation.
 - B) Plot an slide of the density, you can use `imshow()` or `meshgrid()` , take a look to the doc.
 - C) Use the FFT in n dimensions for performing the Fourier Transform. Plot the real and imaginary part of the density in FS.
 - D) Determine k_{min} and k_{max} , you will required later on...
 - E) Estimate the power spectrum, (Hint: remember the definition in terms of the variance).
 - A) When computing the average par $|k|$, the tricky step is to think the k range.
 - B) Take care of the normalization factors that depends on the FFTW convention, check the doc of the numpy functions used.
 - F) *Compute the window function associated with the density assignment used, (and dimensions).
 - G) *Plot the window function.
 - H) Subtracting the shot noise, for this you need to compute the number density par Mpc^3 .

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