

Assignment 8

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Imports

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In [ ]: import numpy as np
import matplotlib.pyplot as plt
from astroML.correlation import bootstrap_two_point_angular
```

Question 1

Calculate the angular two-point correlation function of galaxies (including errors obtained by 10 bootstrap resamples) using subset of data from the Blanco Cosmology Survey with r-band magnitude between 17 and 20, and using 16 logarithmic-spaced angular bins from $1/60^\circ$ to 1° . Use a linear scale for Y-axis. Galaxies in Blanco Cosmology Survey have spread model > 0.002 . This data can be downloaded from http://www.iith.ac.in/~shantanud/BCS05hr_reduced.txt

```
In [ ]: # extracting input data from website
data = np.loadtxt('https://www.iith.ac.in/~shantanud/BCS05hr_reduced.txt')

# filtering the data according to parameters
data = data[data[:,2] < 20]
data = data[data[:,2] > 17]
data = data[data[:,3] > 0.002]

# function for finding angular two-point correlation
def two_point_correlation(N):
    LINS = np.linspace(np.log10(1.0/60.0), np.log10(6), 16)
    bins = 10 ** LINS
    results = [bins]
    for d in [data]:
        results += bootstrap_two_point_angular(d[:,0], d[:,1], bins=bins, method='monte')
    return results

# applying function according to the question asked
(bins, b_corr, b_corr_err, b_bootstraps) = two_point_correlation(10)
# finding bin centers
bin_centers = 0.5 * (bins[1:] + bins[:-1])

# plotting the values from angular two-point correlation
plt.figure(figsize=(10,7))
plt.xscale('log')
plt.yscale('linear')
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plt.errorbar(bin_centers, b_corr, b_corr_err, fmt='.k', ecolor='red', lw=1)
plt.xlabel(r'$\theta$', size = 13)
plt.ylabel(r'$w(\theta)$', size = 13)
plt.title('Angular Two-Point Correlation', size = 15)
plt.grid()
plt.show()
```

