

Antenna Lab Assignment-2

OBJECTIVE:

When you have completed this exercise, you will be familiar with using Matlab software to sketch the radiation pattern of different antennas and antenna arrays in 2-D and 3-D .

PROCEDURE AND REQUIREMENTS

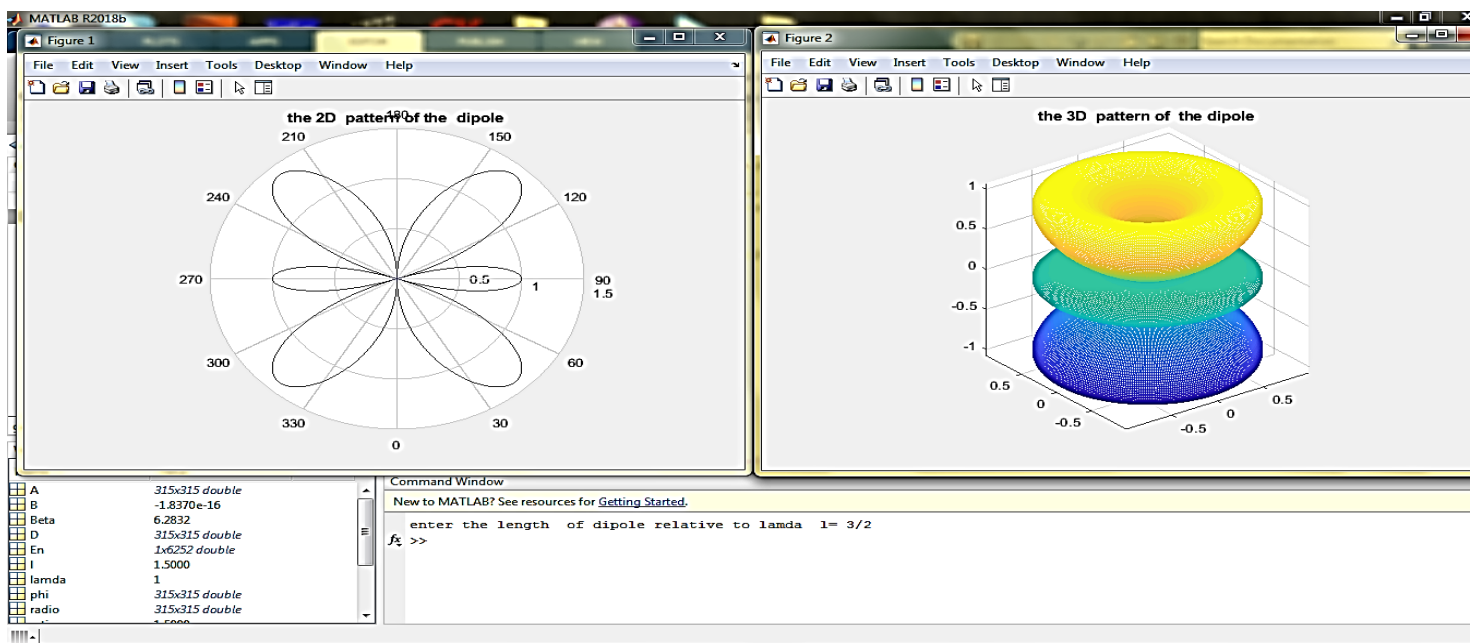
I. Part 1 : linear antenna (dipole of general length)

in this part you are required to write a Matlab code to sketch the radiation pattern of a general length dipole in 2-D and 3-D the code must ask the user to enter the length of dipole and it sketches the pattern in both 2-D and 3-D

hint : you will need the expression of **far field radiation** of general length dipole.

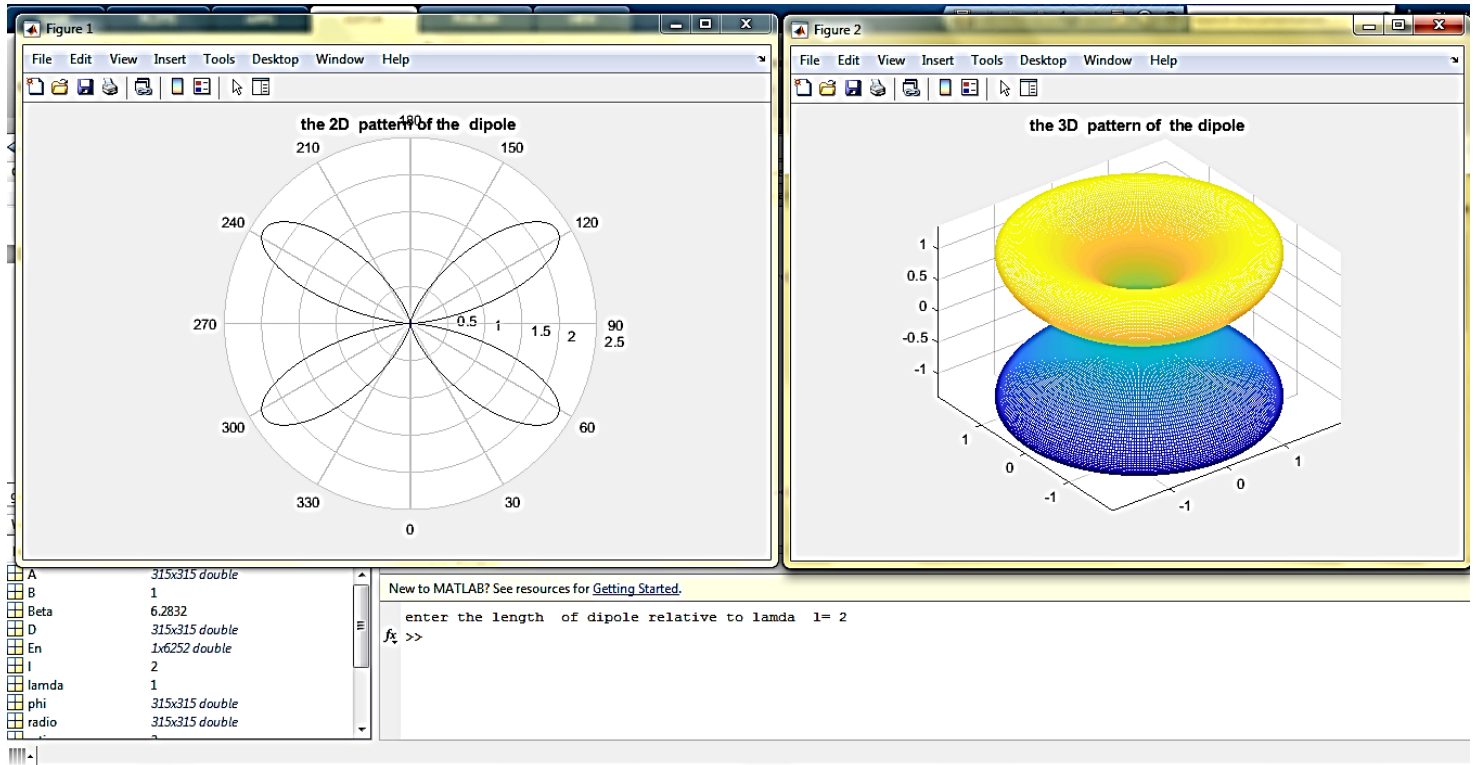
Example 1 :

With length $l = \frac{3\lambda}{2}$ your results have to be something like that



Example 2:

With length $l = 2\lambda$ your results have to be something like that



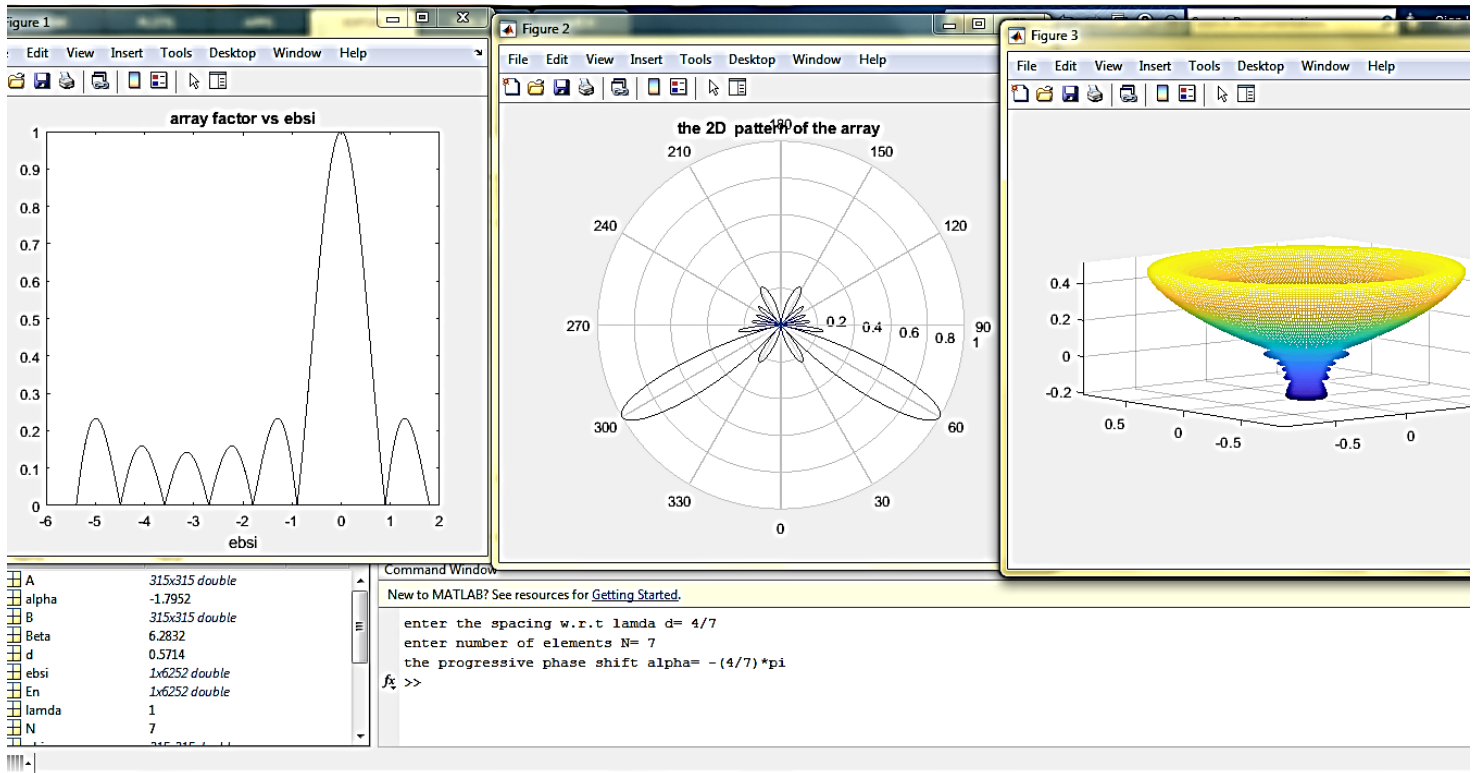
II. Part 2 : Uniform linear antenna array(ULA)

in this part you are required to write a Matlab code to sketch the array factor of a general uniform linear antenna array in 2-D and 3-D the code must ask the user to enter the number of elements of array ,the progressive phase shift ,and the spacing between elements and then it sketches the pattern in both 2-D and 3-D

Example 1 :

With spacing $d = \frac{4\lambda}{7}$, Number of elements $N = 7$, Progressive phase shift $\alpha = \frac{-4\pi}{7}$

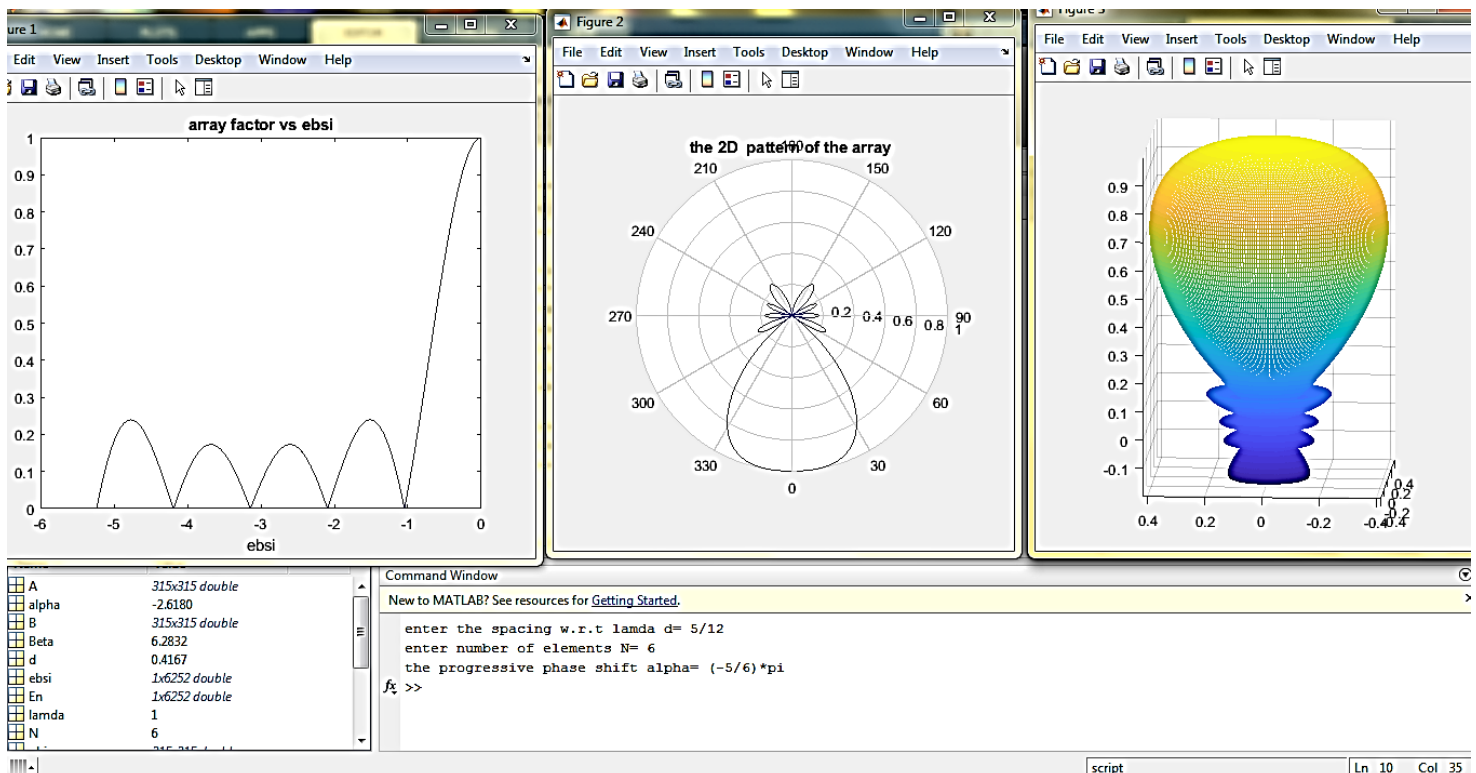
your results have to be something like that



Example 2 :

With spacing $d = \frac{5\lambda}{12}$, Number of elements $N = 6$, Progressive phase shift $\alpha = \frac{-5\pi}{6}$

your results have to be something like that



I. Part 3 : Nonuniformly-Fed linear antenna array

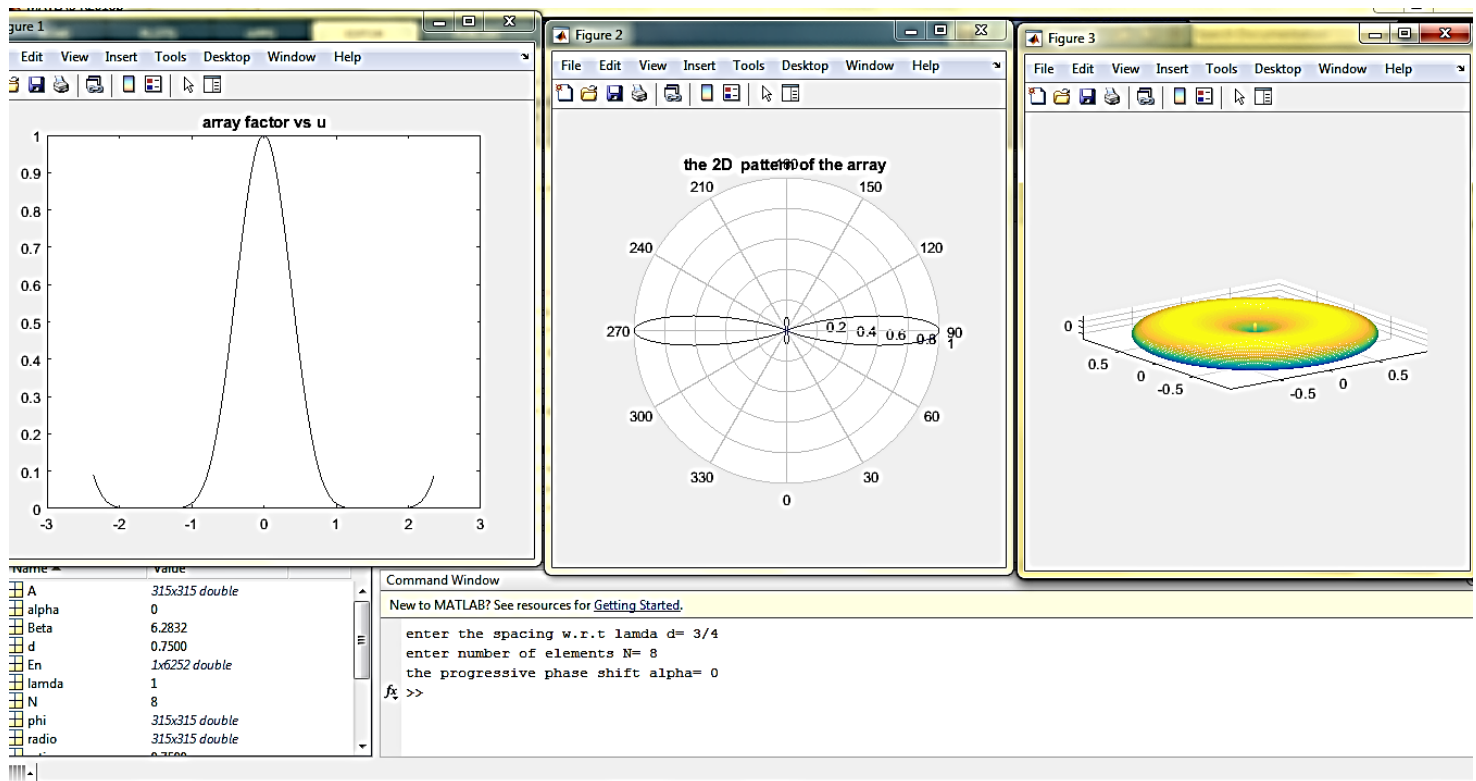
A. Binomial Arrays

in this part the feeding amplitudes of the array are selected in accordance with the coefficients of the binomial expansion , you are required to write a Matlab code to sketch the array factor of a general Binomial linear antenna array in 2-D and 3-D the code must ask the user to enter the number of elements of array ,the progressive phase shift ,and the spacing between elements and then it sketches the pattern in both 2-D and 3-D

Example 1 :

With spacing $d = \frac{3\lambda}{4}$, Number of elements $N = 8$, Progressive phase shift $\alpha = 0$

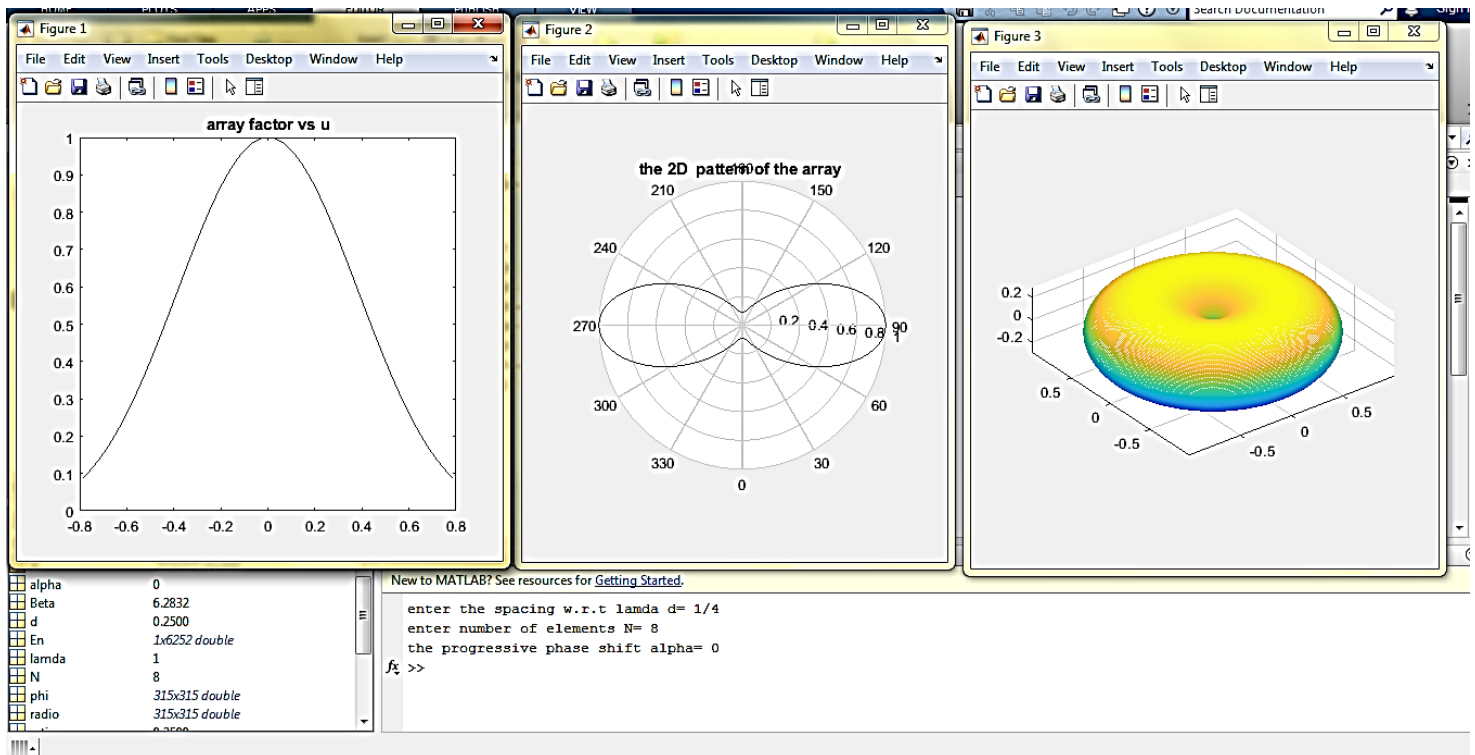
your results have to be something like that



Example 2 :

With spacing $d = \frac{\lambda}{4}$, Number of elements $N = 8$, Progressive phase shift $\alpha = 0$

your results have to be something like that



B. Dolph-Tschebyscheff Arrays

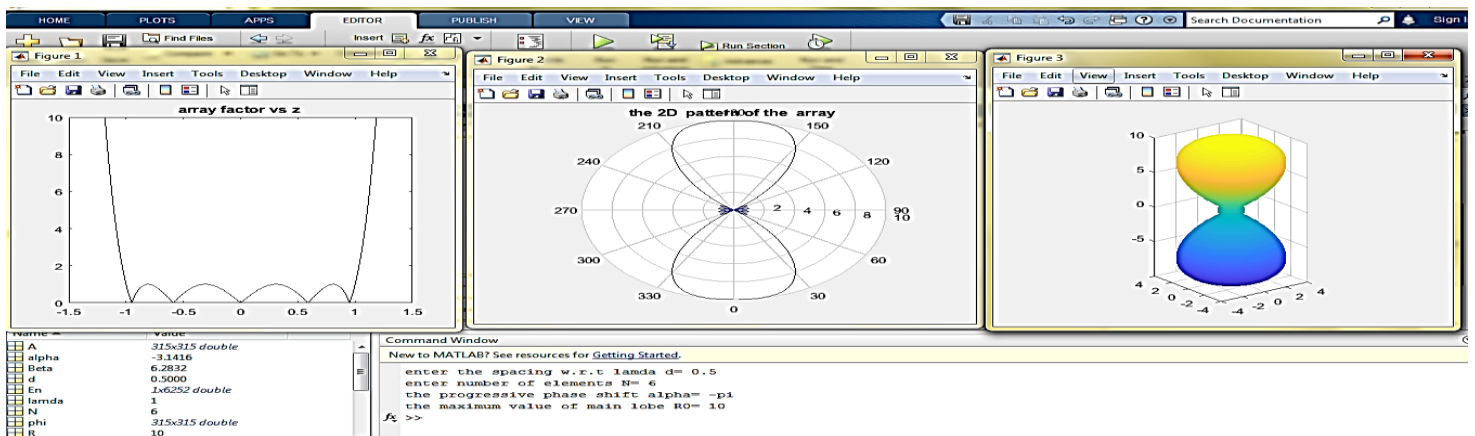
you are required to write a Matlab code to sketch the array factor of a general Tshebyscheff - linear antenna array in 2-D and 3-D the code must ask the user to enter the number of elements of array ,the progressive phase shift , the spacing between elements and the main lobe to side lobe level R_0 , and then it sketches the pattern in both 2-D and 3-D

Example 1 :

With spacing $d = \frac{\lambda}{2}$, Number of elements $N = 6$, Progressive phase shift $\alpha = -\pi$,

Mainlobe to sidelobe level $R_0 = 10$

your results have to be something like that



SUBMISSION:

- Every 3 students should turn in one code/ report.
- You are required to submit the Matlab code and a printed report of results (apply the codes to different examples not included in that assignment).
- There would be a quick discussion.