Çankaya University – ECE Department – ECE 635

2011 Autumn Term **01.11.2011**

Experiment 4 : Plotting and observing the changes in beams with variations in source parameters

Experiment coded in MATLAB (with file name Beamtypes1.m) is given on webpage of ECE 635.

1. Copy the experiment file into the directory of your name.
2. Run the file, observe the OPs, do not record anything yet. Try to follow what is intended and what is happening.
3. This m file plots the 3D intensity profiles and contour graphs of fundamental Gaussian, cosh Gaussian, cos Gaussian and annular Gaussian beams at the displacement parameter of $D_s = 0,\ 200,\ 200j,\ 0\ \text{m}^{-1}$ and source sizes of $\alpha_s = 1\ \text{cm}$ for Gaussian, cosh Gaussian, cos Gaussian, $\alpha_{s1} = 1\ \text{cm}$, $\alpha_{s2} = 0.8\ \text{cm}$ for annular Gaussian beam.
4. Assess the dependence of intensity profiles of cosh and cos Gaussian beams on displacement parameter D_s and on A_1, A_2, α_{s1}, α_{s2} for annular Gaussian beam.
5. By adjusting the A_1, A_2, D_{s1}, D_{s2} generate sinh and sine beams.
6. By using Hermite polynomials and by switching to Cartesian coordinates, create higher orders of Gaussian, cosh Gaussian, cos Gaussian and annular Gaussian beams. Examine the dependence of intensity profiles on a_x, b_x, a_y, b_y parameters of the Hermite polynomials.
7. Include your comments and graphs for the experiment in your notebook