Çankaya University – ECE Department – ECE 474

2013 Spring Term **March 2013**

Experiment 5 : Finding β, beta, r_{min} and r_{max} in graded index fibres

Experiment coded in MATLAB (with file name WKBcurves.m) is given on webpage of ECE 474.

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 experiment plots the graphs of radial component k_r over the cross section of the fibre in core and cladding regions. At the same time it marks and calculates the turning points, i.e., r_{min} and r_{max} of ray trajectory. Finally it calculates β (beta), the propagation constant.
4. By using different settings for ν and m, plot, check whether the numeric values for r_{min} and r_{max} read from the graph agree with those found from the roots of k_r expression.
5. For at least ten different values of ν and m, plot graphs, record r_{min} and r_{max} values, examine the β (beta) values and by making reference to k_1 and k_2, state what type of modes (rays) each set of ν and m represent.
6. Record the outputs to print them in your experiment report.
7. Include your comments for the experiment