

Experiment no. 4

Aim: To study attenuation characteristics of the optical fiber

Lab Outcome: Analyze attenuation during transmission of light through optical fiber

Software: Scilab

Theory:

- a) Attenuation: Signal attenuation is nothing but loss of optical signal during transmission. Signal attenuation (fiber loss) largely determines the maximum repeater-less separation between optical transmitter & receiver. In optical fiber communications the attenuation is usually expressed in decibels per unit length (i.e. dB/km)

$$\alpha = \frac{10}{L} \log_{10} \frac{P_i}{P_o} \text{ (dB/km)}$$

Problem statement: Solve following problems and write scilab code to verify your answers.

1. The mean optical power launched into an optical fiber link is 1.5 mW.
 - a) Plot output power vs distance for different values of attenuation coefficient.
 - b) Determine the maximum possible link length without repeaters (assuming lossless connectors) for $\alpha = 2\text{dB/km}$, 0.5dB/km and 0.2dB/km . The minimum mean optical power level required at the detector is $2\text{ }\mu\text{W}$.

Program: attach print out of program and output

Conclusion: