Design and construction of Bi-Directional Transmission System through single fibre with the same wavelength

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Abstrak

The advantages optical fiber in communication field are widely utilized in developing steps from electrical communication to optical communication. Optical fiber communication promise extremely high data rate over long distance transmission without needing to amplify and retransmit along the way. It is well understood that if frequency of the transmitted signals. is increased some problems such as electromagnetic interferences. crosstalk and signal distortions will appear. Those difficulties can. be solved or eliminated by using optical fiber cable. instead of copper cable.

Optical fiber used to transmit and to receive information signal mutinously was usually separated in difference fibers for transmitting and receiving direction. I n this thesis a bi-directional transmission system through a single fiber with same wavelength by the use of rod lenses was constructed. A simple circuit design techniques have been used in order to make transmitter and receiver. To combine and to separate transmitter and receiver in each side to and from the fiber, two quarter-pitch GRIN rod lenses functioning as optical directional coupler was used.

The result of the experiment as a model of bi-directional optical communication system shows a good performance with an appropriate reliability. The measurement results of power distribution loss. crosstalk and signal transmission quality that have been evaluated to conclude the entire result.