



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS



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Symmetric Nonlinear Directional Couplers
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SHORT ABSTRACT

The recent recognition that optical systems can provide a ground to realize the mathematical concepts of parity-time (PT) symmetry in the table-top experiments, P T symmetry in photonics systems has become a very active research area. In photonics, PT symmetry has been readily established by judiciously incorporating balanced gain and loss in coupled system so that the refractive index profile plays the role of the complex potential. In this thesis, we use coupled waveguides (nonlinear directional couplers) for exploiting the effect of PT symmetry for switching dynamics of optical signals. Considering the application of nonlinear directional couplers as an all-optical switching device, we have studied the steering and switching dynamics of different solitons inside PT-symmetric coupler maneuvering the dispersion and the nonlinearity of the system. All the investigated PT-symmetric couplers evidently emerged to be a better choice as an optical switching device in contrast to their conventional counterparts showing unique PT-symmetric features.