Title:	Dynamics of Coupled Nonlinear Oscillators and Multiplex Networks of Logistic Maps
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Abstract:	In this thesis, we studied some basic properties of dynamical systems in the first chapter, in particular, Linear Stability analysis which provides a framework to understand the stability of a dynamical system in the neighborhood of fixed points. In the second chapter, we apply the Linear stability formalism to a general system coupled by mean-field diffusive coupling. We then use the framework to analyze the steady state of groups of Landau Stuart(LS) Oscillators coupled via a common environment. We obtain the different steady-state solutions of the LS Oscillator in the parameter space of the oscillator-environment coupling strength. In the third chapter, we study the multiplex network. Our main emphasis was on the intra-layer and inter-layer synchronization and to understand the effect of various parameters on the synchronization region. We considered the prototypical logistic map at the nodes of both layers of the multiplex network. Further, we study the emergent dynamics under parameter mismatch in the layers of the multiplex network.
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