Title:	Mathematical Modelling of Layered Cellular Network
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Abstract:	We live in a very complex and dynamical world. From minuscule molecules to giant human social network we can clearly see each single unit in these system is interacting among themselves as well as units from outside the system. And these collective interaction among the units of these systems gives rise to the fascinating phenomenon that we see in our surrounding. To understand this phenomenon from mathematical perspective we have used the framework of Networks in my thesis as we are not just looking at individual units but also the different interactions among them. A network is the framework that comprises of set of nodes or individual units in the system and interactions among those units. Since the real world network are complex and different nodes may have different kind of interactions, we have to extend this idea of Network to Multilayer Network where in each layer nodes are having an unique intralayer interactions and while doing so they are also interacting from one layer to another in a totally separate way by interlayer interactions. For example, in a cell proteins are interacting among themselves but also interacting with DNA. I have worked on the this same Protein-DNA system and to describe effect of perturbation in protein-protein interaction network I have used the model give in the paper ”Propagation of large concentration changes in reversible protein-binding networks”[MI07] and how proteins regulate gene transcription I have used Hill function. The aim of my thesis is to come up with a multilayer network model to see how perturbations in protein-protein interaction network can affect transcription activity of gene.
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