Reduction of signal transduction networks: a system-level understanding of the EGF Signaling pathways

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The fundamental goal of systems biology is to gain greater insight into cell functions and dynamic interactions between pathways, which can describe inter- and extra-cellular dynamics. As cellular networks possess numerous components such as genes, proteins, and other molecules, a major problem in this area is the complexity rising from the huge number of kinetic parameters and intricate interactions among them. Moreover, typical kinetic models span a wide range of orders of magnitude, which result in the stiffness and multiple time-scales of kinetic modeling problems.

In this study, model simplification methods such as order reduction are considered to relieve the stiffness and to obtain the accurate information on the dominating dynamics.