

## A Theoretical Framework for Analysis of Biochemical Networks

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Cellular signalling pathways often may be viewed as cascades of biochemical networks, where the output of the  $i$ -th level becomes the input to the  $(i+1)$ -th level of the cascade. The analysis of each signalling module, in a control theoretic framework, will help understand the interactions among the different components in biological systems, as well as their final outcome.

Some stability and convergence results for networks of Horn-Jackson-Feinberg type, are generalized to the case of time-varying parameters. In this context, each signal transduction module can be individually studied as a system with inputs. Analysis of the system when the reaction rates are controlled by an independent process, or robustness with respect to parameter fluctuations, are natural consequences of an input-to-state stability property.