Dynamic Signatures Generated by Regulatory Networks
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Consider a regulatory network presented as a directed graph with annotated edges that indicate if the first node is up-regulating or down-regulating the second node. What kind of dynamics can this network generate? While this may seem to be an inadequately posed question it arises fairly often in biological contexts. Our motivation for addressing it arises from gene regulatory networks where we assume that the nodes represent genes and act as switches. However, we do not assume that we know the appropriate parameter values let alone the nonlinear reactions that govern the switches. Nevertheless, as I will describe in this talk, for moderate sized networks we can give a mathematically justifiable, computationally tractable, description of the global dynamics for a large class of ode models and a wide range of parameter values.