Differential equation approximation of network processes

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The exact mathematical model of a stochastic network process, like epidemic propagation on a graph, can be formulated as a large system of linear ODEs. Despite of the fact that the mathematical model is relatively simple, the analytical or numerical study of the system gets hard when the number of nodes in the graph is large. Hence the approximation of the system by simple non-linear ODEs is one of the most important tools of investigation. In this talk we show how the accuracy of these approximations can be studied rigorously by using differential equation and functional analytic tools.