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The Effect of Experiment Design on Network Inference. Preliminary report.

The network inference or reverse engineering problem consists on estimating the connectivity of a system from data. This problem is an important aspect of many areas of applied mathematics, specially when modeling biological systems. Recently, algorithms to reverse engineer Boolean network models have been developed; however, methods for collecting the data sets have not been examined sufficiently and it is not known what is the best way to collect data in order to obtain the best inferred network. In this talk, we show that for Boolean networks there are optimal ways to collect data for the network inference problem, based on the number of nodes in the network and the amount of data that is available. The results of our work provide a basis for researchers to obtain the most efficient data set, depending on experimental circumstances, to perform network inference. (Received September 22, 2012)