

IS-1: Design of experiments for unique wiring diagram identification

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When molecular biologists perform experiments, they introduce perturbations whose effect they may anticipate but wish to confirm. However, since the outputs may happen to deviate from the expected, it is desirable to design experiments in such a way that maximizes the chance that the outputs, regardless of what they turn out to be, will increase our understanding of the system. In this talk we'll introduce a method which generates data sets that are guaranteed to result in a unique minimal wiring diagram regardless of what the experiment outputs are. We use as a modeling framework polynomial dynamical systems and utilize the correspondence between simplicial complexes and square-free monomial ideals to construct an algorithm for identifying sets whose interpolating minimal polynomials have a unique support.