

Coupled Systems of Differential Equations

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Networks of differential equations can be defined by directed graphs. The graphs (or network architecture) indicate who is talking to whom and when they are saying the same thing. We ask: Which properties of solutions of coupled equations follow from network architecture. Answers include "patterns of synchrony" for equilibria and "patterns of phase-shift synchrony" for time-periodic solutions. We show how these properties can be used to explain surprising results in binocular rivalry experiments and we discuss how homeostasis can be thought of as a network phenomenon.