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*Transient dynamics for equilibrium and non-equilibrium communities*

Asymptotically stable states continue to be the subject of study in most dynamical systems models in biology. However, true convergence to such states is rare in real systems. For example, human activities or natural events may perturb locally stable equilibrium communities. The study of transient dynamics attempts to gain information about the qualitative behaviour of dynamical systems before an asymptotically stable state is reached.

One particular question of transient dynamics asks how long a biological community will take to return to a stable steady state after a perturbation and how "far" from that state it may get in the process. To answer those questions, researchers have defined the "resilience" and "reactivity" of a system. For an appropriate choice of norms, these quantities can be measured in terms of eigenvalues of certain matrices. I will first review these measures and discuss some of the links to matrix analysis. Then I will suggest possible extensions of the theory to periodically forced systems and periodic orbits in autonomous systems and examine some of their properties.