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Implications of the stability of linearizations

Let $x = \phi(t)$ be a bounded solution of the C^1 autonomous system $\dot{x} = f(x)$ in \mathbb{R}^n . It is an exercise to show that the omega limit set of this solution is a stable hyperbolic equilibrium if and only if the linearized system $\dot{y} = \frac{\partial f}{\partial x}(\phi(t))y$ is uniformly asymptotically stable. This talk will present similar conditions for the omega limit set to be a stable hyperbolic equilibrium or a homoclinic or heteroclinic cycle with certain attraction properties.

Work is joint with Michael Li.