

## New Qualitative Methods for Stability of Delay Systems.

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*Abstract:* A qualitative method is explored for analyzing the stability of systems. The approach is a generalization of the celebrated Lyapunov method. Whereas classically, the Lyapunov method is based on the simple comparison theorem, deriving suitable candidate Lyapunov functions remains mostly an art. As a result, in the realm of delay equations, such Lyapunov methods can be quite conservative. The generalization is here in using the comparison theorem directly with a different scalar equation with known qualitative behavior. It leads to criteria for stability of general difference and delay differential equations.

*Keywords:*

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