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# Stability of delay differential systems

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## Abstract

In this talk we present new explicit tests of the exponential stability of delay differential systems. We demonstrate, for example, that although the second order ordinary differential equation  $x''(t)+p(t)x(t)=0$  can be oscillatory and unstable, the delay differential equation  $x''(t)+a(t)x(h(t))-b(t)x(g(t))=0$ , where  $a(t)-b(t)=p(t)$ , can be nonoscillatory and exponentially stable. Exponential stability of second order delay equations can be achieved without damping term. Results of this sort were considered impossible. New stability results for delay differential systems are obtained on the basis of new results about nonoscillation of scalar delay equations. For the study of nonoscillation, the technique of differential inequalities is developed. Applications to stabilization of various models are discussed.

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