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Stability Criteria for Certain High Even Order Delay Differential Equations

In this paper we study the asymptotic stability of the zero solution of even order linear delay differential equations of the form

$$y^{(2m)}(t) = \sum_{j=0}^{2m-1} a_j y^{(j)}(t) + \sum_{j=0}^{2m-1} b_j y^{(j)}(t - \tau)$$

where a_j and b_j are certain constants and $m \geq 1$. Here $\tau > 0$ is a constant delay. In proving our results we make use of Pontryagin's theory for quasi-polynomials.

It is clear that with $4m$ independent parameters in (1.1) one cannot expect to get regions of stability. Our goal is to derive algorithmic type stability criteria.