

STABILITY CRITERIA FOR CERTAIN NEUTRAL EQUATIONS WITH TWO DELAYS

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

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

where $a_j, b_j, \alpha \in (-1, 0) \cup (0, 1)$ are constants and $m \geq 1$. Here $\tau > 0$ is a constant delay. In this paper, we obtain a necessary condition and obtain robust methods of determining whether the zero solution is asymptotically stable. In proving our results we make use of Pontryagin's theory for quasi-polynomials.

Keywords. asymptotic stability, stability criteria, sufficient conditions, delay, characteristic functions, stability regions.

AMS (MOS) subject classification: 45E99, 34D99.

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