ON EXPONENTIAL STABILITY OF SOLUTIONS OF NEUTRAL DIFFERENTIAL SYSTEM WITH MULTIPLE VARIABLE DELAYS

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Abstract

In this work, we establish sufficient conditions which guarantee the solutions of neutral delay differential system of the form

$$\begin{cases} \dot{x}(t) = A(t)x(t) + \sum\limits_{i=1}^{n} B_i(t)x(t-h_i(t)) + \sum\limits_{i=1}^{n} C_i(t)\dot{x}(t-h_i(t)) + f_1(t,x(t)) \\ \quad + f_2(t,x(t-h_1(t)),...,x(t-h_n(t))) + f_3(t,\dot{x}(t-h_1(t)),...,\dot{x}(t-h_n(t))) \\ x(s) = \phi(s),\ \dot{x}(s) = \varphi(s),\ s \in [-h_i,\, 0],\ (i = 1,\, 2,...,\, n) \end{cases}$$

are globally exponentially stable. The obtained result includes and improves some results in the literature.

Keywords: Neutral delay differential system, Lyapunov functional, globally exponentially stable.

References

[1] J. Kuang, H. Tian, K. Shan, Asymptotic stability of neutral differential systems with many delays, Appl. Math. Comput. 217 (2011) 10087-10094.

[2] M. Syed Ali, On exponential stability of neutral delay differential system with nonlinear uncertainties, Commun. Nonlinear Sci. Numer. Simul. 17 (2012) 2595-2601.

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