ULTIMATE BOUNDEDNESS AND PERIODICITY RESULTS FOR CERTAIN THIRD ORDER NONLINEAR ORDINARY DIFFERENTIAL EQUATIONS

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Abstract

In this paper, we shall give sufficient conditions for the ultimate boundedness and periodicity of solutions for some system of third nonlinear ordinary differential equations of the form

$$\dddot{X} + \Psi(X, \dot{X})\ddot{X} + \Phi(\dot{X}) + cX = P(t, X, \dot{X}, \ddot{X}),$$

where Ψ is $n \times n$-continuous symmetric matrix function, Φ is a continuous vector function, c is a positive constant and $P : \mathbb{R}^+ \times \mathbb{R}^n \times \mathbb{R}^n \times \mathbb{R}^n \to \mathbb{R}^n$ continuous in their respective arguments. Using the basic tools of a complete Lyapunov function, earlier results are generalized.

Keywords and phrases: boundedness, Lyapunov function, nonlinear third order differential equation.