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OSCILLATION CRITERIA FOR SECOND ORDER NEUTRAL DIFFERENTIAL EQUATIONS WITH POSITIVE AND NEGATIVE COEFFICIENTS

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Abstract. In this paper oscillatory and asymptotic behavior of solutions of a class of nonlinear second order neutral differential equations with positive and negative coefficients of the form

$$(r_1(t)(x(t)+p_1(t)x(\tau(t)))')'+r_2(t)(x(t)+p_2(t)x(\sigma(t)))' \\ +p(t)G(x(\alpha(t)))-q(t)H(x(\beta(t)))=0$$

and

$$(r_1(t)(x(t)+p_1(t)x(\tau(t)))')'+r_2(t)(x(t)+p_2(t)x(\sigma(t)))' \\ +p(t)G(x(\alpha(t)))-q(t)H(x(\beta(t)))=f(t)$$

are studied for $p_1(t), p_2(t) \in C([t_0,\infty),\mathbb{R})$. Moreover, using Banach fixed point theorem, sufficient conditions are obtained for the existence of bounded positive solutions of the forced equation.

Keywords. Oscillatory, asymptotic behaviour, neutral differential equations, positive and negative coefficients.

AMS (MOS) subject classification: 34 C 10, 34 C 15.

References

[1] E. M. E. Zayed and M. A. El-Moneam, Some oscillation criteria for second order nonlinear functional ordinary differential equations, *Acta Math. Sci*, **27B(3)**, (2007) 602-610.

[2] I. Gyori and G. Ladas, Oscillation Theory of Delay Differential Equation with Application, Claredon Press, Oxford, 1991.

[3] W. Shi, P. Wang, Oscillation criteria of a class of second-order neutral functional differential equations, *Appl. Math. Comput*, **146**, (2003) 211-226.

[4] X. Lin, Oscillation of second-order nonlinear neutral differential equations, *J. Math. Anal. Appl*, **309**, (2005) 442-452.

[5] Y. Bai and L. Liu, New Oscillation criteria for second-order neutral delay differential equations with positive and negative cefficients, *Abst. Appl. Anal*, **564068**, (2010).

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