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OSCILLATION CRITERIA FOR SECOND ORDER NONLINEAR DIFFERENTIAL EQUATIONS WITH DAMPING AND MIXED NONLINEARITIES

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Abstract. In this paper we present some oscillation criteria for the second order differential equation of the form

$$(r(t)x'(t))' + p(t)x'(t) + q(t)x(t) + \sum_{j=1}^{n} q_j(t)|x^{\alpha_j}(t)| \text{ sgn } x(t) = e(t), t \geq 0$$

where $r(t) \in C^1[0,\infty)$, $p(t)$, $q(t)$, $q_j(t)$, $e(t) \in C[0,\infty)$, $r(t) > 0$, $\alpha_1 > \ldots > \alpha_m > 1 > \alpha_{m+1} > \ldots > \alpha_n > 0 (n > m \geq 1)$ without assuming that $p(t)$, $q(t)$, $q_j(t)$ and $e(t)$ are nonnegative. In particular, for $n = 1$, we obtain some new oscillation criteria. The results obtained in this paper extend and improve some of the existing results.

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1. Introduction.

Consider the following second order differential equation of the form

$$(1.1)\quad (r(t)x'(t))' + p(t)x'(t) + q(t)x(t) + \sum_{j=1}^{n} q_j(t)|x^{\alpha_j}(t)| \text{ sgn } x(t) = e(t), t \geq 0$$

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