

## Comparison and oscillatory behavior for certain second order nonlinear dynamic equations

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**Abstract** We present some new necessary and sufficient conditions for the oscillation of second order nonlinear dynamic equation

$$(a(x^\Delta)^\alpha)^\Delta(t) + q(t)x^\beta(t) = 0$$

on an arbitrary time scale  $\mathbb{T}$ , where  $\alpha$  and  $\beta$  are ratios of positive odd integers,  $a$  and  $q$  are positive  $rd$ -continuous functions on  $\mathbb{T}$ . Comparison results with the inequality

$$(a(x^\Delta)^\alpha)^\Delta(t) + q(t)x^\beta(t) \leq 0 \quad (\geq 0)$$

are established and application to neutral equations of the form

$$(a(t)([x(t) + p(t)x[\tau(t)]]^\Delta)^\alpha)^\Delta + q(t)x^\beta[g(t)] = 0$$

are investigated.

**Keywords** Comparison theorems · Oscillation · Nonoscillation · Time scale

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