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# Oscillation criteria for second order superlinear dynamic equations with oscillating coefficients

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**Abstract.** This paper is concerned with oscillation of second order superlinear dynamic equations with oscillating coefficients. By using generalized Riccati transformations, oscillation theorems are obtained on an **arbitrary** time scale. We illustrate the versatility of our results by means of examples.

*Keywords:* superlinear; Oscillation; Second order; Time scales

## 1 Introduction

In this paper, we consider the following second order superlinear dynamic equation

$$(r(t)x^\Delta(t))^\Delta + p(t)x^\alpha(\sigma(t)) = 0, \quad t \in \mathbb{T}, \quad t \geq t_0, \quad (1.1)$$

where the independent variable is in a time scale  $\mathbb{T}$ ,  $\alpha > 1$  is a quotient of odd positive integers.

For the sake of simplicity, we use  $[t_1, t_2] = [t_1, t_2]_{\mathbb{R}} \cap \mathbb{T}$ . Throughout this paper, we shall assume the following condition holds:

$$(H) \quad p \in C_{rd}(\mathbb{T}, \mathbb{R}), \quad 1/r \in C_{rd}(\mathbb{T}, \mathbb{R}^+) \quad \text{and} \quad \int_{t_0}^{\infty} \frac{1}{r(s)} \Delta s < \infty.$$

For background information on time scales, we refer to the monographs by Bohner and Peterson [1]. The oscillation theory of dynamic equations has been developed extensively during the past several years. We refer the reader to [2–9, 11] and the references cited therein. For completeness, we review some earlier results. In 1975, Kusano et al [8] considered the following differential equation

$$(r(t)x'(t))' + p(t)x^\alpha(t) = 0, \quad t \geq t_0 \quad (1.2)$$

and established the following necessary and sufficient conditions when  $r(t) > 0$  and  $\int_{t_0}^{\infty} \frac{1}{r(t)} dt < \infty$ .

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