ROCKY MOUNTAIN
JOURNAL OF MATHEMATICS
Volume 34, Number 4, Winter 2004

OSCILLATION OF SECOND ORDER NONLINEAR DYNAMIC EQUATIONS ON TIME SCALES

M. BOHNER AND S.H. SAKER

ABSTRACT. By means of Riccati transformation techniques, we establish some oscillation criteria for a second order nonlinear dynamic equation on time scales in terms of the coefficients. We give examples of dynamic equations to which previously known oscillation criteria are not applicable.

1. Introduction. Much recent attention has been given to dynamic equations on time scales, or measure chains, and we refer the reader to the landmark paper of Hilger [**12**] for a comprehensive treatment of the subject. Since then, several authors have expounded on various aspects of this new theory; see the survey paper by Agarwal et al. [**1**] and the references cited therein. A book on the subject of time scales by Bohner and Peterson [**5**] summarizes and organizes much of the time scale calculus. For the notions used below, we refer to the next section about the calculus on time scales and the references given therein.

In recent years there has been much research activity concerning the oscillation and nonoscillation of solutions of some different equations on time scales. We refer the reader to the papers [**2, 3, 6, 8**–**11**].

In [**6**], the authors consider the second order dynamic equation

$$(p(t)x^{\Delta})^{\Delta} + q(t)x^{\sigma} = 0 \quad \text{for} \quad t \in [a, b] \tag{1.1}$$

and give necessary and sufficient conditions for oscillation of all solutions on unbounded time scales. Unfortunately, the oscillation criteria are restricted in usage since additional assumptions have to be imposed on the unknown solutions. In [**9**] the authors consider the same equation and suppose that there exists some $t_0 \in \mathbf{T}$ such that p is bounded

AMS *Mathematics Subject Classification.* 34K11, 39A10, 39A99 (34A99, 34C10, 39A11).
Key words and phrases. Oscillation, second order nonlinear dynamic equation, time scale, Riccati transformation technique, positive solution, measure chain.
Received by the editors on July 30, 2002, and in revised form on Sept. 23, 2002.