Conference of the International Journal of Arts & Sciences,
CD-ROM. ISSN: 1943-6114 :: 10(03):237–238 (2017)

OSCILLATION CRITERIA FOR DELAY DYNAMIC EQUATIONS ON TIME SCALES

Sermin Öztürk

Afyon Kocatepe University, Turkey

Özkan Öcalan

Akdeniz University, Turkey

This study is dedicated to examine the oscillatory behavior of first order delay dynamic equation $x^{\Delta}(t)+p(t)x(\tau(t))=0$ for $t\in[t_0\infty)_T$, where T is a time scale unbounded above with $t_0\in T, p\in C_{rd}(T,R^+), \tau\in C_{rd}(T,T)$ and $\tau(t)<t$ for $t\in T$ and $supT = \infty$. We obtain a new oscillation criteria for the above equation on time scales. We prove that all solutions of this equation oscillate providing the condition $M>2m+(2/(\lambda_1))-1$ satisfies when $M<1$ and $0<m\le 1/e$ such that the numbers m and M be defined $m = liminf \int_{\tau(t)}^{t} p(s)\Delta S$ and $M = limsup \int_{\tau(t)}^{t} p(s)\Delta S$, where $\lambda_1\in[1,e]$ is the unique root of the equation $\lambda_1 = e^{m\lambda}$.

Keywords: Oscillation, time scale, first order delay dynamic equation.

2010 Mathematics Subject Classification: Primary. 34C10 Secondary. 34N05, 39A12, 39A21.

References

1. M. Bohner and A. Peterson, Dynamic Equations on Time Scales: An Introduction with Applications, Birkhauser, Boston, 2001.
2. M. Bohner and A Peterson, Advances in Dynamic Equations on Time Scales, Birkhauser, Boston 2003.
3. M. Bohner, Some Oscillation criteria for first order delay dynamic equations, Far East J. Appl. Math., 18 (3), (2005), 289-304.
4. J. Chao, On the oscillation of linear differential equations with deviating arguments, Math. in Practice and Theory, 1, (1991), 32-40.
5. G. E. Chatzarakis, R. Koplatadze and I. P. Stavroulakis, Oscillation criteria of first order linear difference equations with delay argument, Nonlinear Anal., 68, (2008), 994-1005.