

## SOME OSCILLATION RESULTS FOR SECOND ORDER NEUTRAL TYPE DIFFERENCE EQUATIONS

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*Abstract.* This paper is concerned with the oscillatory behavior of second order neutral difference equations. Four oscillation theorems for such equations are established and examples are given to illustrate the results.

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### REFERENCES

- [1] R.P. AGARWAL, *Difference Equations and Inequalities*, Second Edition, Marcel Dekker, New York, 2000.
- [2] R.P. AGARWAL, M. BOHNER S.R. GRACE, AND D. O'REGAN, *Discrete Oscillation Theory*, Hindawi Publ. Corp., New York, 2005.
- [3] J. JIANG, *Oscillation of second order nonlinear neutral delay difference equations*, Appl. Math. Comp., **146** (2003), 791–801, doi:10.1016/S0096-3003(02)00631-8.
- [4] R. KOPLATADZE, G. KRINKADZE AND I.P. STAVROULAKIS, *Oscillation of second order linear difference equations with deviating arguments*, Adv. Math. Sci. Appl., **12**, (1) (2002), 217–226.
- [5] H.J. LI AND C.C. YEH, *Oscillation criteria for second order neutral difference equations*, Comp. Math. Appl., **36** (1998), 123–132, doi:10.1016/S0898-1221(98)80015-1.
- [6] J. LU, *Oscillation criteria for second order neutral difference equations*, Ann. Diff. Eqns., **14** (1998), 262–266.
- [7] Y.G. SUN AND S.H. SAKER, *Oscillation for second order nonlinear neutral delay difference equations*, Appl. Math. Comput., **163** (2005), 909–918, doi:10.1016/j.amc.2004.04.017.
- [8] E. THANDAPANI, Z. LIU, R. ARUL AND P.S. RAJA, *Oscillation and asymptotic behavior of second order difference equations with nonlinear neutral terms*, Appl. Math. E-Notes, **4** (2004), 59–67.
- [9] E. THANDAPANI AND K. MAHALINGAM, *Oscillation and nonoscillation of second order neutral delay difference equations*, Czech. Math.J., **53**, (128) (2003), 935–947, doi:10.1023/B:CMAJ.0000024532.03496.b2.
- [10] E. THANDAPANI AND K. MAHALINGAM, *Necessary and sufficient conditions for oscillation of second order neutral delay difference equations*, Tamkang J. Math., **34**, (2) (2003), 137–145.
- [11] E. THANDAPANI AND P. MOHANKUMAR, *Oscillation and nonoscillation of nonlinear neutral delay difference equations*, Tamkang J.Math., **38**, (4) (2007), 323–333.
- [12] E. THANDAPANI, S. PANDIAN AND R.K. BALASUBRAMANIAM, *Oscillation of solutions of nonlinear neutral difference equations with nonlinear neutral term*, Far-East J. Appl. Math., **15**, (1) (2004), 47–62.
- [13] E. THANDAPANI AND S. SELVARANGAM, *Oscillation theorems of second order quasilinear neutral difference equations*, J. Math. Comput. Sci., **2**, (4) (2012), 866–879.
- [14] E. THANDAPANI, P. SUNDARAM, J.R. GRAEF, AND P.W. SPIKES, *Asymptotic properties of solutions of nonlinear second order neutral delay difference equations*, Dyn. Sys. Appl., **4** (1995), 125–136.
- [15] D.M. WANG AND Z.T. XU, *Oscillation of second order quasilinear neutral delay difference equations*, Acta Math. Appl. Sinica, **27**, (1) (2011), 93–104, doi:10.1007/s10255-011-0043-4.