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INTERVAL OSCILLATION CRITERIA FOR SECOND ORDER DAMPED HALF–LINEAR DIFFERENTIAL EQUATIONS WITH FORCING TERM

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Abstract. By using an inequality due to Hardy, Littlewood and Polya and averaging functions, several interval oscillation criteria are established for the second-order damped half-linear differential equation with forcing term of the form $(r(t)|y'(t)|^{\alpha-1}y'(t))' + p(t)|y'(t)|^{\alpha-1}y'(t) + q(t)|y(t)|^{\alpha-1}y(t) = e(t)$ that are different from most known ones in the sense that they are based on the information only on a sequence of subintervals of $[t_0, \infty)$, rather than on the whole half-line, where $\alpha > 0$. In particlar, several examples that dwell upon the importance of our results are also included.

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REFERENCES

[1] M. S. KEENER, *Solutions of a certain linear nonhomogeneous second order differential equations*, Appl. Anal., **1** (1971), 57–63.
[2] S. M. RAINKIN, *Oscillation theorems for second order nonhomogeneous linear differential equations*, J. Math. Anal. Appl., **53** (1976), 550–553.
[3] A. SKIDMORE AND J. J. BOWERS, *Oscillatory behavior of solutions of* $y'' + p(x)y = f(x)$, J. Math. Anal. Appl., **49** (1975), 317–323.
[4] A. SKIDMORE AND W. LEIGHTON, *On the equation* $y'' + p(x)y = f(x)$, J. Math. Anal. Appl., **43** (1973), 46–55.
[5] H. TEUFEL, *Forced second order nonlinear oscillations*, J. Math. Anal. Appl., **40** (1972), 148–152.
[6] A. G. KARTSATOS, *Maintenance of oscillations under the effect of a periodic forcing term*, Proc. Amer. Math. Soc., **33** (1972), 377–383.
[7] M. A. EL–SAYED, *An oscillation criterion for a forced second order linear differential equations*, Proc. Amer. Math. Soc., **118** (1993), 813–817.
[8] J. S. WONG, *Oscillation criteria for a forced second order linear differential equation*, J. Math. Anal. Appl. , **231** (1999), 235–240.
[9] W. T. LI, *Oscillation of certain second–order nonlinear differential equations*, J. Math. Anal. Appl., **217** (1998), 1–14.
[10] W. T. LI, *Oscillation theorems for second order nonlinear differential equations with integrable coefficients*, Mathl. Comput. Modelling, **37** (7) (2000), 71–79.
[11] W. T. LI, *Positive solutions of second order nonlinear differential equations*, J. Math. Anal. Appl., **221** (1998), 326–337.
[12] W. T. LI AND R. P. AGARWAL, *Interval oscillation criteria related to integral averaging technique for certain nonlinear differential equations*, J. Math. Anal. Appl., **245** (2000), 171–188.
[13] W. T. LI, AND R. P. AGARWAL, *Interval oscillation criteria for second order nonlinear differential equations with forceing term*, Applicable Analysis, **75** (3/4) (2000), 341–347.

[14] W. T. LI, AND R. P. AGARWAL, *Interval oscillation criteria for second order forced nonlinear differential equations with damping*, PanAmerican Mathematical Journal, **11** (3) (2001), 109–117.
[15] G. H. HARDY, LITTLEWOOD AND G. POLYA, *Inequalities*, 2nd Edition, Cambridge University Press, Cambridge, 1988.