

ON THE EXISTENCE OF PERIODIC SOLUTIONS
OF A CERTAIN CLASS OF SECOND ORDER
NONLINEAR DIFFERENTIAL EQUATION

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Abstract. A second order nonlinear differential equation is considered. Leray-Schauder principle is used to show the existence of periodic solutions. The results obtained are then applied to a specific example, where a computer program based on the fourth order Runge-Kutta method and Newton-Raphson algorithm is used to compute the periodic solutions.

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REFERENCES

- [I.] J. CRONIN, *Fixed points and topological degree in nonlinear analysis*, Math. Survey II, American Math. Soc., Providence, RI., 1964.
- [II.] A. C. LAZER, *On Schauder's fixed point theorem and forced second order nonlinear oscillations*, J. Math. Anal. Appl. **21** (1968), 421–425.
- [III.] R. REISSIG, *On the existence of periodic solutions of certain non autonomous differential equations*, Ann. Math. Pura Appl. **85** (1970), 230–240.
- [IV.] ———, *Periodic Solution of a third order nonlinear differential equation*, Annli di Mathematica **112** (1972), 193–198.
- [V.] D. SHADMAN, B. MEHRI, *On the periodic solutions of certain nonlinear third order differential equations*, Zamm Z. angew. Math. Mech. **75**, 2 (1995), 164–166.
- [VI.] R. REISSIG, *Perturbations of a certain critical n -th order differential equation*, Bolletino della Unione Matematica Italiana (4) II, Suppl. fase **3** (1975), 131–141.
- [VII.] B. MEHRI, *203–210*, Indian J. Pure Appl. Math. **21** (3) (1990).
- [VIII.] H. O. TEJUMOLA, *Periodic Solutions of certain non-dissipative systems of third order differential equations*, Colloquia Mathematica Societatis Janos Bolyai 30. Qualitative theory of differential equations, Szeged (Hungary) (1979).
- [IX.] J. STOER, R. BULRISCH, *Introduction to numerical Analysis*, Springer Verlag, 1979.