

Tang, Chun-Lei

Solvability of the forced Duffing equation at resonance. (English) Zbl 0915.34032

J. Math. Anal. Appl. 219, No. 1, 110-124 (1998).

The forced Duffing equation

$$u'(t) + m^2\omega^2u(t) + g(u(t)) = h(t), \quad t \in [0, T], \quad u(0) - u(T) = u'(0) - u'(T) = 0,$$

with $T > 0$, $\omega = 2\pi/T$, $g \in C(\mathbb{R}, \mathbb{R})$, and $h \in L^1(0, T)$, is considered. Using minimax methods a new solvability condition in both cases, $m = 0$ and $m \geq 1$, is obtained. Three theorems concerning these conditions are proved.

Reviewer: [B.Cheshankov \(Sofia\)](#)

MSC:

34C25 Periodic solutions to ordinary differential equations

Cited in **13** Documents

Keywords:

[forced Duffing equation](#)

Full Text: [DOI](#)

References:

- [1] Caristi, G., Monotone perturbations of linear operator having nullspace made of oscillating functions, *Nonlinear anal.*, 11, 851-860, (1987)
- [2] Gossez, J.P.; Omari, P., Periodic solutions of a second order ordinary differential equation: A necessary and sufficient condition for nonresonance, *J. differential equations*, 94, 67-82, (1991) · [Zbl 0743.34045](#)
- [3] Iannacci, R.; Nkashama, M.N., Unbounded perturbations of forced second order ordinary differential equations at resonance, *J. differential equations*, 69, 298-309, (1987) · [Zbl 0627.34008](#)
- [4] Lazer, A.C., On Schauder's fixed point theorem and forced second-order nonlinear oscillations, *J. math. anal. appl.*, 21, 421-425, (1968) · [Zbl 0155.14001](#)
- [5] Mawhin, J., Nonlinear oscillations: one hundred years after Liapunov and Poincaré, *Z. angew. math. mech.*, 73, T54-T62, (1993) · [Zbl 0801.34037](#)
- [6] Mawhin, J.; Ward, J.R., Periodic solutions of some forced Liénard differential equations at resonance, *Arch. math.*, 41, 337-351, (1983) · [Zbl 0537.34037](#)
- [7] Mawhin, J.; Willem, M., *Critical point theory and Hamiltonian system*, (1989), Springer-Verlag New York/Berlin
- [8] Yosida, K., *Functional analysis*, (1980), Springer-Verlag Berlin/Heidelberg/New York · [Zbl 0217.16001](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.