SECOND–ORDER FUNCTIONAL PROBLEMS
WITH A RESONANCE OF DIMENSION ONE

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Abstract. We obtain, using the coincidence degree theory, solvability conditions for all possible resonance scenarios \( Lu = u'' = f(t, u, u') = Nu \), with linear functional conditions \( B_i u = 0 \), \( i = 1, 2 \) with \( \dim \ker L = 1 \). Our work generalizes and improves the results of Zhao and Liang [18] and Cui [3] in several directions. We also construct a meaningful example of a nonlinear functional problem for a pendulum equation which not only satisfies the assumptions of an existence theorem but also has a closed-form solution.


Keywords and phrases: Carathéodory conditions, coincidence degree theory, functional condition, pendulum equation, resonance.

REFERENCES


