EXISTENCE THEORY FOR NONLINEAR STURM–LIOUVILLE PROBLEMS WITH NON–LOCAL BOUNDARY CONDITIONS

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Abstract. In this work we provide conditions for the existence of solutions to nonlinear Sturm-Liouville problems of the form

\[(p(t)x'(t))' + q(t)x(t) + \lambda x(t) = f(x(t))\]

subject to non-local boundary conditions

\[ax(0) + bx'(0) = \eta_1(x) \text{ and } cx(1) + dx'(1) = \eta_2(x).\]

Our approach will be topological, utilizing Schaefer’s fixed point theorem and the Lyapunov-Schmidt procedure.

Keywords and phrases: Existence theory, Sturm-Liouville problem, boundary conditions.

REFERENCES


