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EXISTENCE THEORY FOR NONLINEAR STURM–LIOUVILLE PROBLEMS WITH UNBOUNDED NONLINEARITIES

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

$$(p(t)x'(t))' + q(t)x(t) + \lambda x(t) = f(\varepsilon, x(t))$$

subject to

$$ax(0) + bx'(0) = 0 \text{ and } cx(1) + dx'(1) = 0.$$

Our approach will be topological, utilizing both degree theory and the Lyapunov-Schmidt procedure.

Mathematics subject classification (2010): 34B15.

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