CONSTRUCTIVE EXISTENCE RESULTS FOR SOLUTIONS TO SYSTEMS OF BOUNDARY VALUE PROBLEMS VIA GENERAL LYAPUNOV METHODS

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Abstract. In this work we consider boundary value problems (BVPs) for systems of second-order, ordinary differential equations. A priori bounds on solutions are obtained via differential inequalities involving general Lyapunov functions without the need for maximum principles. These bounds are then applied to produce new existence theorems via topological methods. Some constructive results are also developed via A-proper mappings and the Galerkin method, in which solutions to the BVP may be approximated.

Keywords and phrases: Boundary value problem, ordinary differential equation, existence of solutions, differential inequality, Lyapunov functions, systems of equations.

REFERENCES