STRONG CONTINUITY OF THE LIDSTONE EIGENVALUES OF THE BEAM EQUATION IN POTENTIALS

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Abstract. In this paper we study the dependence of the Lidstone eigenvalues \( \lambda_m(q) \), \( m \in \mathbb{N} \), of the fourth-order beam equation on potentials \( q \in L^p[0,1] \), \( 1 \leq p \leq \infty \). The first result is that \( \lambda_m(q) \) have a strongly continuous dependence on potentials, i.e., as nonlinear functionals, \( \lambda_m(q) \) are continuous in \( q \in L^p[0,1] \) when the weak topology is considered. The second result is that \( \lambda_m(q) \) are continuously Fréchet differentiable in potentials \( q \in L^p[0,1] \) when the \( L^p \) norm is considered. These results will be used in studying the optimal estimations for these eigenvalues in later works.

Keywords and phrases: Beam equation, eigenvalue, strong continuity, weak topology, Fréchet differentiability.

REFERENCES

