

Kong, Q.; Zettl, A.

Dependence of eigenvalues of Sturm-Liouville problems on the boundary. (English)

Zbl 0856.34027

J. Differ. Equations 126, No. 2, 389-407 (1996).

The paper concerns a selfadjoint Sturm-Liouville problem on the interval $[a, b]$. The left endpoint of this interval is fixed and the second one, b , varies in the interval (a, B) , $B \leq \infty$. Continuous dependence of the eigenvalues and eigenfunctions on b is proved. Moreover, it is shown that eigenvalues as functions of b satisfy first-order differential equations. These equations are obtained for different types of selfadjoint boundary conditions.

Based on the differential equations, the authors discuss the behaviour of the eigenvalues as functions of the endpoint b . They show that the difference between Dirichlet and Neumann eigenvalues goes to infinity as the length of the interval shrinks to zero.

The results are an extension of the Dauge-Helffer theorems [cf. *M. Dauge* and *B. Helffer*, J. Differ. Equations 104, 263-297 (1993; Zbl 0807.34033)].

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MSC:

34B24 Sturm-Liouville theory

34L15 Eigenvalues, estimation of eigenvalues, upper and lower bounds of ordinary differential operators

Cited in **21** Documents

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selfadjoint Sturm-Liouville problem; eigenvalues; eigenfunctions

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