

One Boundary-Value Problem Perturbed by Abstract Linear Operator

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Abstract

The investigation of regular boundary value problems for which the eigenvalue parameter appears in both the ordinary differential equation and the boundary conditions originates from the Birkhoff's work [3]. In recent years, more and more researchers are interested in the discontinuous Sturm-Liouville problems. Various physics applications of this kind of problems are found in many literatures (see [1], [2], [6]). The purpose of this paper is to study a Sturm-Liouville problem with discontinuities in the case when an eigenparameter appears not only in the differential equation but also in the boundary conditions. Moreover, the "differential equation" contained also an abstract linear operator (unbounded in general) in the Hilbert space $L_2(-1, 0) \oplus L_2(0, 1)$. We apply a different approach for investigation some spectral properties of this problem.

References

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