

# Riesz basis property of generalized eigenfunctions for many interval BVTP's with eigenparameter dependent boundary conditions

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**Abstract:** The main goal of this study is to provide an operator-pencil framework for the investigation of many-interval boundary-value-transmission problems (BVTP) with eigenparameter appearing in the boundary-transmission conditions. By applying an our own approaches the considered problem is transformed into an eigenvalue problem for suitable integral equation in terms of which it is defined a concept of generalized eigenfunctions. We introduce some self-adjoint compact operators in suitable Sobolev spaces such a way that the considered problem can be reduced to an operator-pencil equation. Finally, it is shown that the spectrum is discrete and the set of generalized eigenfunctions form a Riesz basis of the suitable Hilbert space.

**Keywords:** Boundary value problems, boundary and transmission conditions, eigenvalues, generalized eigenfunctions, Riesz basis.

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