

A STURM-LIOUVILLE PROBLEM DEPENDING RATIONALLY ON THE EIGENVALUE PARAMETER

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We consider eigenvalues of the following Sturm–Liouville problem

$$-y'' + \left(q - \lambda - \frac{w}{u - \lambda}\right)y = 0$$

on the interval $[0, 1]$ with Dirichlet boundary conditions, where q , u , and w are real functions. If u is piece-wise continuous, then in every gap of the range of u the eigenvalues can be characterised by a variational principle with an index shift. The behaviour at the end-points of the gaps and the number of eigenvalues are investigated.