The Riesz Basis Property of Indefinite Sturm-Liouville Problems with a Non Odd Weight Function

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For the Sturm-Liouville eigenvalue problem $-f'' = \lambda r f$ on $[-1, 1]$ with Dirichlet boundary conditions and with an indefinite weight function r changing it's sign at 0 we discuss the question whether the eigenfunctions form a Riesz basis of the Hilbert space $L^2_{|r|}[-1, 1]$. So far a number of sufficient conditions on r for the Riesz basis property are known. However, a sufficient and necessary condition is only known in the special case of an odd weight function r. We shall here give a generalization of this sufficient and necessary condition for certain generally non odd weight functions satisfying an additional assumption.