

## Numerical Computation of Sturm-Liouville Problem with Robin Boundary Condition

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**Abstract :** The modelling of physical phenomena, such as the earth's free oscillations, the vibration of strings, the interaction of atomic particles, or the steady state flow in a bar give rise to Sturm-Liouville (SL) eigenvalue problems. The boundary applications of some systems like the convection-diffusion equation, electromagnetic and heat transfer problems requires the combination of Dirichlet and Neumann boundary conditions. Hence, the incorporation of Robin boundary condition in the analyses of Sturm-Liouville problem. This paper deals with the computation of the eigenvalues and eigenfunction of generalized Sturm-Liouville problems with Robin boundary condition using the finite element method. Numerical solutions of classical Sturm-Liouville problems are presented. The results show an agreement with the exact solution. High results precision is achieved with higher number of elements.

**Keywords :** Sturm-Liouville problem, Robin boundary condition, finite element method, eigenvalue problems

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