SPECTRAL THEORY AND COMPUTATIONAL METHODS OF STURM-LIOUVILLE PROBLEMS pdf

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2: SLEIGN2 home page

Presenting the proceedings of the conference on Sturm-Liouville problems held in conjunction with the 26th Barrett Memorial Lecture Series at the University of Tennessee, Knoxville, this text covers both qualitative and computational theory of Sturm-Liouville problems.

Liouville - ACM Trans. Software , " The main purpose of the SLEIGN2 code is to compute eigenvalues and eigenfunctions of regular and singular Sturm-Liouville problems, with both separated and coupled boundary conditions, and to approximate the cont The main purpose of the SLEIGN2 code is to compute eigenvalues and eigenfunctions of regular and singular Sturm-Liouville problems, with both separated and coupled boundary conditions, and to approximate the continuous spectrum in the singular case. The code uses a number of different algorithms, some of which are new, and has a user-friendly interface. In this paper the algorithms and their implementation are discussed, and the class of problems to which each algorithm applies is identified. Show Context Citation Context The minimal conditions of 3. We consider some geometric aspects of regular Sturm-Liouville problems. First, we clarify a natural geometric structure on the space of boundary conditions. This structure is the base for studying the dependence of Sturm-Liouville eigenvalues on the boundary condition, and reveals many new propert This structure is the base for studying the dependence of Sturm-Liouville eigenvalues on the boundary condition, and reveals many new properties of these eigenvalues. In particular, the eigenvalues for separated boundary conditions and those for coupled boundary conditions, or the eigenvalues for self-adjoint boundary conditions and those for non-self-adjoint boundary conditions, are closely related under this structure. Then, we give complete characterizations of several subsets of boundary conditions such as the set of self-adjoint boundary conditions that have a given real number as an eigenvalue, and determine their shapes. The shapes are shown to be independent of the dierential equation in question. Moreover, we investigate the dierentiability of continuous eigenvalue branches under this structure, and discuss the relatio Left-definite regular self-adjoint Sturm-Liouville problems with separated and coupled bound-ary conditions are studied. Pruefer transforma-tion techniques can Pruefer transforma-tion techniques can be used to establish the existence of and to give a characterization for the eigenvalues in the case of separated boundary conditions. Here we give an elementary proof of the existence of the eigenvalues for the coupled case. Furthermore we study the continuous and differentiable dependence of the eigenvalues on all parameters of the problem. For a fixed equation we find the range of each eigenvalue as a function of the boundary conditions and inequalities among the eigenvalues as the boundary conditions vary. These extend the classical inequalities among the Neumann, Dirichlet, Periodic, and Semi-Periodic eigenvalues and our recent generalizations for the right-definite case. Some of our results here yield an algorithm for the numerical computation of the eigenvalues of left-definite problems with coupled boundary conditions. It is useful to consider the related right-definite equation: Our major results ar We consider self-adjoint regular Sturm-Liouville problems with positive leading coecients and weight functions. A new proof of the inequalities among the eigenvalues for separated boundary conditions and those for coupled boundary conditions established recently by three of the authors with M. This new proof does not assume that any special case of the inequalities has been proven. Primary 34B24; Secondary 34L05, 34L Consider a self-adjoint regular Sturm-Liouville problem SLP with a positive leading coecient and a positive weight function, i. The self-adjoint regular Sturm-Liouville problem consisting of 0. Multiplicity of Sturm-Liouville eigenvalues by Q. This paper is dedicated to Norrie Everitt on the occasion of his 80th birthday. The geometric multiplicity of each eigenvalue of a self-adjoint Sturm-Liouville problem is equal to its algebraic multiplicity. This is true for regular problems and for singular problems with limit-circle endp This is true for regular problems and for singular problems with limit-circle endpoints, including the case when the leading coefficient changes sign. The order of a zero is the algebraic multiplicity of the corresponding eigenvalue. This construction depends on the fact that all solutions of the equation and their quasi-derivatives exist, at least as finite limits, at regular endpoints. Since this is not true for singular probl Of particular interest are the cases when at least one endpoint is oscillatory or the leading coefficient function changes sign. In these cases, we show that the index determining each continuous eigenvalue branch has an infinite number of jump discontinuities and give an explicit characterization of these discontinuities. The next theorem construct Mason , " We give the asymptotic behaviour of the eigenvalues under the perturbation. The class of potentials to which this method applies is larger than that covered by standard results which assume uniform ellipticity of the operator or a perturbative term which is analytic in the perturbation parameter. We will not reproduce this theory here. Studie van speciale algoritmen voor het oplossen van Sturm

3: Spectral Theory & Computational Methods of Sturm-Liouville Problems - CRC Press Book

Presenting the proceedings of a recent conference on Sturm-Liouville problems held in conjunction with the 26th Barrett Memorial Lecture Series at the University of Tennessee, Knoxville, this timely volume covers both qualitative and computational theory of Sturm-Liouville problems - surveying current questions in the field as well as describing novel applications and concepts.

4: Spectral theory - Wikipedia

The SLEIGN2 code is based on the ideas and methods of the original SLEIGN code of The main purpose of the SLEIGN2 code is to compute eigenvalues and eigenfunctions of regular and singular Sturm-Liouville problems, with both separated and coupled boundary conditions, and to approximate the continuous spectrum in the singular case.

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Sturm-Liouville problems (cf. Sturm-Liouville problem) have continued to provide new ideas and interesting developments in the spectral theory of operators (cf. also Spectral theory). The Lebesgue decomposition theorem (cf. Lebesgue theorem) leads to a decomposition of the spectral measure into.

6: Sturmâ€“Liouville theory - Wikipedia

In mathematics and its applications, a classical Sturm-Liouville theory, named after Jacques Charles FranÃ§ois Sturm () and Joseph Liouville (), is the theory of a real second-order linear differential equation of the form.

7: AMS :: Mathematics of Computation

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