JAMES BREMER, University of Toronto
Rapid solution of singular Sturm-Liouville problems

We will present an algorithm for the numerical solution of a large class of singular Sturm-Liouville problems. Our method achieves near optimal accuracy and requires only O(N) operations to compute the first N eigenvalues and efficient representations of each of the corresponding eigenfunctions. These efficient representations allow for the evaluation of any eigenfunction at an arbitrary point in O(1) operations. Since many families of special functions are the solutions of singular Sturm-Liouville problems, our algorithm has applications to the numerical evaluation of special functions. We will use the Hermite polynomials, associated Legendre functions and spheroidal wave functions as examples. This is joint work with Richard Chow of the University of Toronto.