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Bradford, PA 16701. *A Newton-type method for solving an inverse Sturm-Liouville problem.*

A Newton-type method is proposed for the recovery of the unknown coefficient function in the canonical Sturm-Liouville differential equation from two spectral data. Specifically, the two spectral data will be used to produce two Cauchy data, which in turn will serve as the input in a nonlinear equation whose unknown is the coefficient function in the canonical Sturm-Liouville differential equation. This nonlinear equation is to be solved numerically by the Newton method. Each Newton iterate requires that a Goursat-Cauchy boundary value problem be solved numerically. The numerical implementation of the Newton method that serves this inverse two spectra problem is illustrated with examples for the case of the two spectra being the Dirichlet eigenvalues, and the Dirichlet-Robin eigenvalues. The numerical examples confirm that the Newton method applied to this inverse Sturm-Liouville problem works well in both situations: given and estimated the boundary parameter. (Received June 27, 2014)