Numerical Approach to the Finite Hankel Transform Eigenfunctions

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In the recent years considerable attention has been focused on the numerical computation of the eigenvalues and eigenfunctions of the finite (truncated) Hankel transform, important for numerous applications. However, due to the very special behaviour of the Hankel transform eigenfunctions, their direct numerical calculation often causes an essential loss of accuracy. Here, we discuss simple, efficient and robust numerical techniques to compute Hankel transform eigenfunctions via the associated singular self-adjoint Sturm-Liouville operator. The properties of the proposed approaches are compared and illustrated by means of numerical experiments.