Numerical Inversion of the Laplace Transform and Viscoelastic Wave Propagation

Richard R. Laverty

Department of Mathematical Sciences
United States Military Academy
West Point, New York

ARL Sponsor: George Gazonas
U.S. Army Research Laboratory
Aberdeen Proving Ground, Maryland

ABSTRACT:

Inverting Laplace Transforms via the Bromwich Integral has proven to be too difficult, in general, to be a practical method for large classes of problems; therefore, approximation techniques abound. In this paper we will examine four commonly used numerical algorithms for Laplace Transform Inversion: Bellman-Kalaba method, Orthogonal Polynomials, Heaviside Collocation and the Dubner-Abate-Crump (DAC) Algorithm. Each will be evaluated on a large class of functions, to test its robustness, then we will investigate how each performs when applied to problems of viscoelastic wave propagation.

KEY WORDS: Laplace Transform, Laplace Transform Inversion, Viscoelasticity, Waves

CONTACT: Richard R. Laverty, USMA, West Point, NY 10996
Tel: (845) 938-2807 email: ar6837@usma.edu