

1018-35-170

James V Lambers* (lammers@stanford.edu), Department of Petroleum Engineering, 367 Panama St Rm 065, Stanford, CA 94305-2220, and **Patrick Guidotti** (gpatrick@math.uci.edu), Department of Mathematics, 103 MSTB, Irvine, CA 92697-3875. *Diagonalizing Similarity Transformations for Variable-Coefficient Differential Operators*. Preliminary report.

Let L be a second-order self-adjoint variable-coefficient differential operator on a bounded interval. We show that using symbolic calculus and anti-differentiation operators, we can efficiently obtain a sequence of unitary similarity transformations $L_{k+1} = U_k^* L_k U_k$, $L_0 = L$, where U_k is the exponential of a skew-symmetric pseudodifferential operator, that approximately diagonalizes L , yielding analytical representations of approximate eigenvalues and eigenfunctions. We also consider non-self-adjoint operators, higher-order operators, and higher spatial dimension. (Received March 05, 2006)