1023-J1-1663 **Elaine T. Hale*** (ehale@rice.edu), Rice University, Dept. of Comp. and Applied Math., 6100 Main St., MS 134, Houston, TX 77005-1892, and **Steven Cox**. *Introducing Eigenvalues by way of the Resolvent.*

Most engineers at Rice University learn linear algebra in the Matrix Analysis course offered by the Department of Computational and Applied Mathematics. The course is distinctive in that it is very applied and yet maintains as much rigor as it can given the mathematical background of the students. This characterization is highlighted by how the course introduces and develops the concepts of eigenvalue and eigenvector. In particular, the students first see eigenvalues in the context of the resolvent, that is, the matrix $(sI - A)^{-1}$ that arises during the solution of a system of linear ordinary differential equations, $x' = Ax$, using the Laplace transform. While such a development requires the introduction of some complex analysis, the benefits include a framework for discussing generalized eigenvectors, algebraic versus geometric multiplicity, and the diagonalization of symmetric matrices. In particular, the Jordan Form follows from the residue theorem and is expressed geometrically as a sum of projection and nilpotent matrices. This paper further describes this approach and the relevant teaching experiences of the authors. (Received September 26, 2006)