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COMPUTATION OF EIGENVALUE AND EIGENVECTOR DERIVATIVES FOR A GENERAL COMPLEX-VALUED EIGENSYSTEM*

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Abstract. In many engineering applications, the physical quantities that have to be computed are obtained by solving a related eigenvalue problem. The matrix under consideration and thus its eigenvalues usually depend on some parameters. A natural question then is how sensitive the physical quantity is with respect to (some of) these parameters, i.e., how it behaves for small changes in the parameters. To find this sensitivity, eigenvalue and/or eigenvector derivatives with respect to those parameters need to be found. A method is provided to compute first order derivatives of the eigenvalues and eigenvectors for a *general* complex-valued, non-defective matrix.

Key words. Eigenvalue derivatives, Eigenvector derivatives, Repeated eigenvalues.

AMS subject classifications. 65F15.

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