On first order asymptotic expansions for multiplicative perturbation of eigenvalues

Fredy Ernesto Sosa Núñez[1], *Julio Moro Carreño*[2]

[1] *Departamento de Matemáticas, Universidad Carlos III de Madrid, España*
E-mail: fsosa@math.uc3m.es
[2] *Departamento de Matemáticas, Universidad Carlos III de Madrid, España*
E-mail: jmoro@math.uc3m.es

Abstract.

Let A be a complex matrix with arbitrary Jordan structure, and λ an eigenvalue of A whose largest Jordan block has size n. Based on the use of the Newton diagram, it has been shown that for a small multiplicative perturbation $\widehat{A} = (I+\varepsilon C)\, A\, (I+\varepsilon B)$ of matrix A, the splitting of λ under this perturbation is, generically, of order $\varepsilon^{1/n}$ if $\lambda \neq 0$. Explicit formulas for the leading coefficients are obtained, involving the perturbation matrices B and C and the eigenvectors of A. In the special case of $\lambda = 0$, similar results has been found for leading coefficients in the splitting of λ in this case the splitting of λ is generically, of order $\varepsilon^{\frac{1}{n+1}}$.