ABSTRACT: We investigate here iteration matrices $T(\omega)$, for solving systems of linear equations, which, like the SOR iterative method, are dependent on a single relaxation parameter, $\omega$. We use a local perturbation analysis, for $\omega$ small, of the extrapolated Jacobi iteration matrix $J(\omega)$, which results in geometrical conditions for the convergence or divergence of $T(\omega)$, for $\omega$ small. Then, an application of this analysis is given for the popular SSOR (symmetric successive overrelaxation) iterative method for solving non-Hermitian systems of linear equations.