1 Eigenvalues of the sum of matrices from unitary similarity orbits

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Let A and B be $n \times n$ complex matrices. Characterization is given for the set $\mathcal{E}(A, B)$ of eigenvalues of matrices of the form $U^*AU + V^*BV$ for some unitary matrices U and V. Consequences of the results are discussed and computer algorithms and programs are designed to generate the set $\mathcal{E}(A, B)$. The results refine those of Wielandt on normal matrices. Extensions of the results to the sum of matrices from three or more unitary similarity orbits are also considered.