Canonical Forms for Pairs of Symmetric, Skew Symmetric, or Hermitian Matrices: Some Applications and Open Problems

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The canonical forms for pairs of real or complex symmetric, skew symmetric, or Hermitian matrices are well known. In recent years, there has been a recurring interest in these forms. Some new applications of the forms will be given, in particular, concerning geometry of joint numerical ranges. Open problems will be formulated in which the canonical forms are likely to play a role.