Taxonomy of $n \times n$ Matrices

Each rectangle represents one class of complex $n \times n$ matrices. Arrows indicate subset relations. Classes in green are closed under multiplication. Classes in blue are closed under multiplication and inversion and form a group. All classes are closed under transposition and simultaneous reordering of rows and columns.

Matrix class | Matrix class | Matrix class
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Ordinary matrix class | Closed under multiplication | Closed under multiplication and inversion
Closed under multiplication and inversion

Legend:

- Even permutation $A_n$
- Permutation $S_n$
- Unit-determinant $SL(n, \mathbb{C})$
- Invertible $GL(n, \mathbb{C})$
- Normal
- Diagonalizable
- Complex
- Real
- Integer
- Special unitary $SU(n)$
- Unitary $U(n)$
- Real skew-symmetric
- Real unit-determinant $SL(n, \mathbb{R})$
- Real invertible $GL(n, \mathbb{R})$
- Real diagonalizable
- Doubly stochastic
- Unimodular $GL(n, \mathbb{Z})$
- Symplectic $Sp(n, \mathbb{R})$
- Rotation $SO(n)$
- Orthogonal $O(n)$
- Hermitian

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