Then the Hermitean matrices can be classified by anti-unitary symmetries. This classification is based on Wigner's Fundamental theorem: a symmetry is either unitary or anti-unitary.

Random matrix ensemble: \((H, P(H))\) probability distribution.

Gaussian random matrix ensemble:

\[ P(H) \propto e^{-\frac{1}{2} Tr(H^2)} \]

In general,

\[ P(H) \propto e^{-\frac{1}{2} Tr(VH^2V^T)} \]

Any function such that \(P(H)\) is normalizable.

Universality correlations are independent of the choice of \(V\).

15.6) Anti-Unitary symmetries.

An anti-unitary symmetry can be written as

\[ A = U V \]

\[ U^* U = 1 \]

Complete conjugation.

Definition of anti-unitary symmetry:

\[ (Ax, Ay) = (x, y)^* \forall x, y \]