

1 Orthogonal adjoint operators and Hermitians

Definition 1. T is self-adjoint if $T^* = T$, i.e.,

$$\langle Tu, v \rangle = \langle u, Tv \rangle$$

so $\mathcal{M}(T)$ in an orthogonal basis is symmetric ($\mathcal{M}_{ij} = \mathcal{M}_{ji}$).

Theorem 1 (spectral thm). If $T : V \rightarrow V$ is self adjoint then T is diagonalizable, with real eigenvalues. Even more, T can be diagonalized in an orthogonal basis of $(V, \langle \cdot, \cdot \rangle)$!