# Self-adjoint operators

## Axler7.11 self-adjoint, Hermitian def

> An operator $T \in \mathcal{L}(V)$ is called *self-adjoint* if $T = T^*$ aka it is adjoint to itself. aka: $T \in \mathcal{L}(V)$ is self-adjoint iff
>
> $$\langle Tv, w \rangle = \langle v, Tw \rangle$$

Because adjoint-ness is in some ways analygous to complex conjugation, a self-adjoint operator is somewhat analygous to real numbers (kinda like a number who equals its conjugates real, a map that equals its adjoint is "real")

## results

### Axler7.13 Eigenvalues of self-adjoint operators are real

> Every eigenvalue of a self-adjoint operator is real.

### Axler7.14 Over $\mathbb{C}$, only the $0$ operator has $Tv$ being orthogonal to $v$ for all $v$

For some **complex** vector space $V$ and $T \in \mathcal{L}(V)$, if

$$\langle Tv, v \rangle = 0$$

for all $v \in V$, then $T = 0$.

### TODO Axler7.15 and Axler7.16??

### Every self-adjoint operator is normal.