

**Source:**

## 1 | eigenvalues

eigenvalue: multiplied by a scalar? a subspace that, when put through a linear map, only gets scaled.

$$Tv = \lambda v$$

**T must be an operator!** Otherwise the matrix sizes don't work out when subtracting  $\lambda I$ .  
where  $v$  is the eigenvector and  $\lambda$  is the eigenvalue. The equation is often rewritten as:

$$Tv - \lambda v = 0Tv - \lambda Iv = 0(T - \lambda I)v = 0$$

now this can be factored and roots can be found. also it's an operator.

### 1.1 | Axler 5.6 equivalent conditions

Only when  $V$  is finite dimensional!

1.1.1  $|T - \lambda I$  is not injective, because both  $v, 0$  are in the null space.

1.1.2  $|T - \lambda I$  is also not surjective or invertible bc finite dim operator.

## 2 | depends on

2.1 | finding roots is helpful