

**Source:**

## 1 | Definition

#definition Axler3.2 Linear Map #aka linear transformation A *linear map* from  $V$  to  $W$  is a function  $T : V \rightarrow W$  with the following properties:

### 1.1 | Additivity

$$T(u + v) = Tu + Tv \forall u, v \in V$$

### 1.2 | Homogeneity

$$T(\lambda v) = \lambda(Tv) \forall \lambda \in \mathbb{F}, v \in V$$

## 2 | Other Notation

### 2.1 | Set of Maps

#definition Axler3.3  $\mathcal{L}(V, W)$

The set of all linear maps from  $V$  to  $W$  is denoted  $\mathcal{L}(V, W)$ .

## 3 | Examples

### 3.1 | zero

Zero is a function  $0 : V \rightarrow W$  s.t.  $0v = 0 \forall v \in V$ . (It takes all vectors in  $V$  and maps them to the additive identity of  $W$ )