

Definitions

- Complex numbers: ordered pair (a, b) , $a, b \in R$
 - Commutativity, associativity, identity, additive inverse, multiplicative inverse, distributive property
- List of length $n \in N_{>0}$ is an ordered collection of n element.
- Vector Space
 - Commutativity of addition, associativity, additive identity, additive inverse, multiplicative identity, distributive property.
- F^S where S is a set denote set of functions from S to F : (ex: hash $\{0, 1\}^U$)

Proofs

Theorem 1. $0v = 0$ for all $v \in V$

Proof. $\forall v \in V$,

$$\begin{aligned} 0v &= (0 + 0)v \\ &= 0v + 0v \\ -0v + 0v &= -0v + (0v + 0v) \\ 0 &= (-0v + 0v) + 0v \\ 0 &= 0v \end{aligned}$$

□