

Fact 1

Distribution properties hold.

1. $A \cdot (B + C) = A \cdot B + A \cdot C$
2. $(A + B) \cdot C = A \cdot C + B \cdot C$

Proof. We will compute the left hand side with the right hand side and show they are equal.

$$\begin{aligned}
 v &= A \cdot (B + C)(v) \\
 &= A \cdot (B + C)(v) \\
 &= A(B(v) + C(v)) \\
 &= A(B(v)) + A(C(v)) \\
 &= A \cdot B(v) + A \cdot C(v) \\
 &= A \cdot B + A \cdot C(v)
 \end{aligned}$$

□

\mathbb{H} = Hamilton quaternions

$$\begin{aligned}
 \mathbb{H} &= \{a + bi + cj + dk : a, b, c, d \in \mathbb{R}\} \\
 &= \{(a, b, c, d) : a, b, c, d \in \mathbb{R}\}
 \end{aligned}$$

$$i^2 = -1$$

$$j^2 = -1$$

$$k^2 = -1$$