

Homework 2 - Tensor algebra

Q2.1. Use diagrammatic methods to show that

(a)

$$\vec{v} \cdot (\underline{\omega} \wedge \underline{\sigma}) = (\vec{v} \cdot \underline{\omega}) \underline{\sigma} - (\vec{v} \cdot \underline{\sigma}) \underline{\omega} \quad (\text{Q2.1.1})$$

(b)

$$\vec{v} \cdot (\underline{\omega} \wedge \underline{\sigma}) = (\vec{v} \cdot \underline{\sigma}) \cdot \underline{\omega} \quad (\text{Q2.1.2})$$

Q2.2. Using Eq. (1.1.22), show that

(a)

$$(\underline{\omega} \wedge \underline{\sigma}) \cdot (\vec{u} \wedge \vec{v}) = (\underline{\omega} \cdot \vec{u}) (\underline{\sigma} \cdot \vec{v}) - (\underline{\omega} \cdot \vec{v}) (\underline{\sigma} \cdot \vec{u}) \quad (\text{Q2.2.1})$$

(b)

$$\underline{\sigma} \cdot (\vec{u} \wedge \vec{v} \wedge \vec{w}) = (\underline{\sigma} \cdot \vec{u}) \vec{v} \wedge \vec{w} + (\underline{\sigma} \cdot \vec{v}) \vec{w} \wedge \vec{u} + (\underline{\sigma} \cdot \vec{w}) \vec{u} \wedge \vec{v} \quad (\text{Q2.2.2})$$