

Physics 201

Chapter 5 Problems

Problem (1)

Let $\mathbf{u} = (1, 0, -2)$, $\mathbf{v} = (1, 1, 1)$, and $\mathbf{w} = (2, -2, 1)$. Calculate $\|\mathbf{u} + \mathbf{v}\| - 2\|\mathbf{w}\|$.

Problem (2)

Calculate the distance between the point $(2, 1)$ and the line $x - 2y + 3 = 0$.

Problem (3)

Find $\text{proj}_{\mathbf{a}}\mathbf{u}$ where $\mathbf{a} = (2, 5, 4)$ and $\mathbf{u} = (1, -2, 3)$.

Problem (4)

Let $\mathbf{u} = (1, 1, 3)$, $\mathbf{v} = (2, 0, 1)$, and $\mathbf{w} = (0, -1, 5)$. Compute $\|\mathbf{u} \times (\mathbf{v} + \mathbf{w})\|$.

Problem (5)

Calculate the volume of the parallelepiped defined by the vectors $\mathbf{u} = (2, 0, 5)$, $\mathbf{v} = (1, -1, 0)$, and $\mathbf{w} = (1, 3, 8)$.

Problem (6)

A plane contains the vectors $\mathbf{u} = (1, 3, -4)$ and $\mathbf{v} = (4, 1, -2)$. Find a vector normal to the plane.