

Answer on Question #64469 – Math – Analytic Geometry

Question

Find the projection of the vector $\vec{i} - \vec{j}$ on the vector $\vec{i} + \vec{j}$.

Solution

Projection of resulting vector $\vec{i} - \vec{j}$ on resulting vector $\vec{i} + \vec{j}$ can be represented as

$$\frac{(\vec{i} - \vec{j}) \cdot (\vec{i} + \vec{j})}{|\vec{i} + \vec{j}|} = \frac{\vec{i}^2 - \vec{j}^2}{\sqrt{\vec{i}^2 + 2\vec{i} \cdot \vec{j} + \vec{j}^2}} = \frac{1 - 1}{\sqrt{1 + 2 \cdot 1 \cdot 1 \cdot \cos \theta + 1}} = 0,$$

because vectors \vec{i} and \vec{j} are unit vectors, $\theta = 90^\circ$ is the angle between them.

Answer: 0.