

Solutions

Math 21C Quiz 5

Section: 5:10-6:00 pm, TA: Arpy Mikaelian
Tuesday May 6, 2008

Let $\mathbf{u} = \langle -1, 2, 1 \rangle$ and $\mathbf{v} = \langle 5, -1, 3 \rangle$.

Problem 1

(5 points): Find the angle between \mathbf{u} and \mathbf{v} . Do not simplify.

p.g. 847 Angle between Two Vectors

$$\theta = \cos^{-1} \left(\frac{u_1 v_1 + u_2 v_2 + u_3 v_3}{\|\mathbf{u}\| \|\mathbf{v}\|} \right) = \cos^{-1} \left(\frac{\mathbf{u} \cdot \mathbf{v}}{\|\mathbf{u}\| \|\mathbf{v}\|} \right)$$

$$= \cos^{-1} \left(\frac{-1 \cdot 5 + 2 \cdot -1 + 1 \cdot 3}{\sqrt{-1^2 + 2^2 + 1^2} \cdot \sqrt{5^2 + (-1)^2 + 3^2}} \right)$$

$$= \cos^{-1} \left(\frac{-4}{\sqrt{6} \cdot \sqrt{35}} \right)$$

where $\|\mathbf{u}\| = \sqrt{u_1^2 + u_2^2 + u_3^2}$ (p.g. 839)