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MAT 102
19/SCI18/001
ARCHITECTURE

$A = 3i + 7j - 2k$, $B = i + 3j + 7k$, $C = 9i - 4j + 6k$

The angle between A and C

$$\cos\theta = \frac{A_iC_i + A_jC_j + A_kC_k}{|A||C|}$$

where $|A|$ and $|C|$ are the Magnitude of A and C

$$|A| = \sqrt{(3)^2 + (7)^2 + (-2)^2}$$
$$= \sqrt{9 + 49 + 4}$$
$$|A| = \sqrt{62}$$
$$= 7.87$$
$$|C| = \sqrt{(9)^2 + (-4)^2 + (6)^2}$$
$$= \sqrt{81 + 16 + 36}$$
$$= 133$$
$$= 11.5$$

Substituting back into the Formular

$$\cos\theta = \frac{3\times9 + 7\times(-4) + (-2)\times6}{7.87 \times 11.5}$$
$$= 27 - 28 - 12$$
$$= \frac{-13}{90.5} \qquad \cos\theta = 0.14$$
$$\theta = \cos^{-1}(0.14) \quad \theta = 1.7^\circ$$

ii $B = i + 3j + 2k$

$C = 9i + 4j + 6k$

The angle between B and C be α

$$\cos\alpha = \frac{B_i C_i + B_j C_j + B_k C_k}{|B||C|}$$

$$|B| = \sqrt{(1)^2 + (3)^2 + (2)^2}$$

$$= \sqrt{1 + 9 + 49}$$

$$= \sqrt{59}$$

$$B = 7.68$$

$$C = 11.5$$

$$\cos\alpha = \frac{1 \times 9 + 3 \times (-4) + 2 \times 6}{11.5 \times 7.7}$$

$$= \frac{9 - 12 + 42}{88.5}$$

$$= \frac{39}{88.5} = 0.4$$

$$\alpha = \cos^{-1}(0.4)$$

$$\alpha = 1.15^\circ //$$