

6-3.3

$$A = i + j - 2k$$

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

$$C = j - 5k$$

Find Work of $F = A + B = 3i + 0j + 1k$ along C

$$\begin{aligned} W = F \cdot C &= (3i + 0j + k) \cdot (0i + j - 5k) \\ &= 0 + 0 - 5 \\ &= -5 \end{aligned}$$

6-3.4

Torque of A about O and line $\perp AB$ thru O .

$$\begin{aligned} \pi &= B \otimes A = \begin{vmatrix} i & j & k \\ 2 & -1 & 3 \\ 1 & 1 & -2 \end{vmatrix} = i(2-3) - j(-4-3) \\ &= B \otimes A \qquad \qquad \qquad + k(2+1) \end{aligned}$$

$$\pi = -1i + 7j + 3k$$

Torque about C $\pi_c = m(\pi \cdot n)$ $C = j - 5k$

$$n_c = \frac{1}{\sqrt{26}}(0i + j - 5k) = \frac{1}{\sqrt{26}}j - \frac{5}{\sqrt{26}}k$$

$$T_c = m_c \cdot (\pi) = m_c \cdot (B \times A) = m_c \cdot (B \otimes A)$$

$$= \left(\frac{1}{\sqrt{26}}j - \frac{5}{\sqrt{26}}k \right) \cdot (-i + 7j + 3k)$$

$$|T_c| = \sqrt{\frac{7}{26}} - \sqrt{\frac{15}{26}} \Rightarrow T_c = -8/\sqrt{26} = -1.57$$

$$T_c = T_c \left(\frac{1}{\sqrt{26}}j - \frac{5}{\sqrt{26}}k \right) = \frac{-8}{26}j + \frac{40}{26}k = -\frac{4}{13}j + \frac{20}{13}k.$$