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Mechanical Engineering

(97)

(i) If $A = (6u^2+8)i + (4u-10)j + 8u^3 k$

$B = 3ui + (2u-5)j + 5k$

(ii) Find $\frac{d}{du}(A \cdot B)$

Solution

$A \cdot B = ((6u^2+8)i + (4u-10)j + 8u^3 k) \cdot (3ui + (2u-5)j + 5k)$

$3u(6u^2+8) + (4u-10)(2u-5) + 8u^3 \times 5$

$= 18u^3 + 24u + 8u^2 - 40u + 50 + 40u^3$

$= 18u^3 + 40u^3 + 8u^2 + 24u - 40u + 50$

$= 58u^3 + 8u^2 - 16u + 50$

$\frac{d}{du}(A \cdot B) = 174u^2 + 16u - 16$

(iii) $\frac{dA}{du} = 12ui + 4j + 24u^2 k$