

OLATUNDE ANUOLUWARO TEMIJOPE MAT 102.

COMPUTER ENGINEERING 19/ENG02/050.

Assignment.

1. $x = t, y = t^2, z = t^3$ at $t = 1$.

$$r = xi + yj + zk.$$

$$r = ti + t^2j + t^3k.$$

$$\frac{dr}{dt} = i + 2tj + 3t^2k.$$

$$dt$$

$$\text{at } t = 1.$$

$$\frac{dr}{dt} = i + 2j + 3k.$$

$$\left| \frac{dr}{dt} \right| = \sqrt{1^2 + 2^2 + 3^2}$$

$$= \sqrt{14}.$$

$$T = \frac{dr/dt}{|dr/dt|} = \frac{i + 2j + 3k}{\sqrt{14}}$$

2. $A = 4t^3j + 5k, B = 2t^2i + 4tj.$

$$G = A \times B = \begin{vmatrix} i & j & k \\ 0 & 4t^3 & 5 \\ 2t^2 & 4t & 0 \end{vmatrix}$$

$$i \begin{vmatrix} 4t^3 & 5 \\ 4t & 0 \end{vmatrix} - j \begin{vmatrix} 0 & 5 \\ 2t^2 & 0 \end{vmatrix} + k \begin{vmatrix} 0 & 4t^3 \\ 2t^2 & 4t \end{vmatrix}$$

$$i(0 - 20t) - j(0 - 10t^2) + k(0 - 8t^5).$$

$$G = -20ti + 10t^2j - 8t^5k.$$

$$\therefore \int_0^1 G = \int_0^1 (-20ti + 10t^2j - 8t^5k).$$

$$= \left(\frac{-20t^2}{2}i + \frac{10t^3}{3}j - \frac{8t^6}{6}k \right) \Big|_0^1$$

$$= \left(-10t^2i + \frac{10t^3}{3}j - \frac{4t^6}{3}k \right) \Big|_0^1$$

When $t = 1$.

$$= -10i + \frac{10}{3}j - \frac{4}{3}k.$$

$$\text{When } t = 0.$$

$$= 0i + 0j - 0k.$$

$$\therefore S'_0 G = -10i + \frac{10}{3}j - \frac{4}{3}k.$$