

TADESE VICTOR ADEDAMOCA
ELECT/ELECT ENGINEERING

19/ENG04/055

MAT 102 ASSIGNMENT

1 $r = ti + t^2j + t^3k$

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

at $t = 1$, r becomes

$$r = i + 2j + 3k$$

$$|r| = \sqrt{1+4+9} = \sqrt{14}$$

$$\text{unit vector} = \frac{i + 2j + 3k}{\sqrt{14}} = \frac{i}{\sqrt{14}} + \frac{2j}{\sqrt{14}} + \frac{3k}{\sqrt{14}}$$

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

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

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

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

$$\int_0^1 -20ti + 10t^2j - 8t^5k = \left[-20t^2/2i + 10t^3/3j - 8t^6/6k \right]_0^1$$

$$= \left(-20/2i + 10/3j - 8/6k \right) - 0$$

$$= -10i + 10/3j - 4/3k$$