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MAT 102

$$x = t \quad y = t^2 \quad z = t^3$$

$$r = xi + yj + zk$$

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

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

$$\left| \frac{dr}{dt} \right| = \sqrt{(1)^2 + (2)^2 + (3)^2} = \sqrt{14}$$

$$T(t) = \frac{dr/dt}{|dr/dt|} = \frac{i + 2tj + 3t^2k}{\sqrt{14}}$$

unit tangent = $t = 1$

$$= \frac{1 + 2(1)j + 3(1)^2k}{\sqrt{14}}$$

14

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

$\sqrt{14}$

$$A = 4t^3 \mathbf{j} + 5 \mathbf{k}$$

$$D = 2t^2 + 4t \mathbf{j}$$

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

$$G = \mathbf{i}(0 - 20) - \mathbf{j}(0 - 10) + \mathbf{k}(0 - 8)$$

$$G = -20\mathbf{i} + 10\mathbf{j} - 8\mathbf{k}$$

$$\int G(t) dt = -20t\mathbf{i} + 10t\mathbf{j} - 3t\mathbf{k} + c$$

$$\int_0^1 G(t) dt = [-20t + 10t - 3t]_0^1$$

$$= 20(1) + 10(4) - 3(1) - 0$$

$$= 20 + 10 - 3 - 0$$

$$= 27 \text{ sau } 27 \text{ unité}$$