Demba Abdelquddus
Civil Eng
16/ENG/003/019
CVG 202
2022

I) Mathematical modelling is a description of a system using mathematical concepts and language

II) - Modelling
- Simulation

2) $r = (t^2 + 3t)i - 2\sin 3t\, j + 3e^{2t} k$

I) $\frac{dr}{dt} = (2t + 3)i - 6\cos 3t\, j + 6e^{2t} k$

II) $\frac{d^2r}{dt^2} = 2i + 18\sin 3t\, j + 12e^{2t} k$

III) $\left|\frac{d^2r}{dt^2}\right|$ at $t = 0$

$= |2i + 18\sin 3(0)\, j + 12e^{2(0)} k|$

$= 2i + 12k$

$= \sqrt{2^2 + 12^2}$

$= \sqrt{148} = 2\sqrt{37}$

iii) $\nabla \times B$

$$\begin{vmatrix} i & j & k \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ yz & -3xz & 2y \end{vmatrix}$$

$$= \left(\frac{\partial 2xy}{\partial y} - \frac{\partial(-3xz)}{\partial z} \right) i - \left(\frac{\partial 2xy}{\partial x} - \frac{\partial yz}{\partial z} \right) j$$

$$+ \left(\frac{\partial(-3xz)}{\partial x} - \frac{\partial yz}{\partial y} \right) k$$

D) Mathematical modelling is a description of a system using mathematical concepts and language

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