

21 JULY

VU
Sem I
Unit-II

Two Thousand Twenty One

TUESDAY

06

Explain Curl of a field vector $\rightarrow$
 This ~~is~~ is ~~the~~ a

part from the operation ∇ . A differentiable vector point function $\vec{A}(x, y, z)$, We may also consider the operation $\nabla \times$ on $\vec{A}(x, y, z)$. The vector product $\nabla \times \vec{A}$ defines the curl of $\vec{A}$ written $\text{curl } \vec{A}$

$$\therefore \text{curl } \vec{A} = \nabla \times \vec{A} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ A_x & A_y & A_z \end{vmatrix}$$

Thus, it is obvious that $\text{curl } \vec{A}$ is a vector function, like $\text{div } \vec{A}$. If $\nabla \times \vec{A} = 0$ then the vector $\vec{A}$ is classified as irrotational. From the ~~def~~ definition of

PRIORITY

APPOINTMENTS

NOTES

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AUG
2021

Talent win games, but teamwork and intelligence win championship - Michael Jordan



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$\text{div } \vec{A}$ and $\text{curl } \vec{A}$, we may write for the two vector function $\vec{A}$ and $\vec{B}$

$$\text{div} (\vec{A} + \vec{B}) = \text{div } \vec{A} + \text{div } \vec{B}$$

$$\text{i.e. } \vec{\nabla} \cdot (\vec{A} + \vec{B}) = \vec{\nabla} \cdot \vec{A} + \vec{\nabla} \cdot \vec{B}$$

$$\text{and } \text{curl} (\vec{A} + \vec{B}) = \text{curl } \vec{A} + \text{curl } \vec{B}$$

$$\text{i.e. } \vec{\nabla} \times (\vec{A} + \vec{B}) = \vec{\nabla} \times \vec{A} + \vec{\nabla} \times \vec{B}$$

The operation $\vec{\nabla}$ thus obeys the distributive law.

The physical interpretation of the vector is related to the rotation or circulation of a vector field.