Divergence

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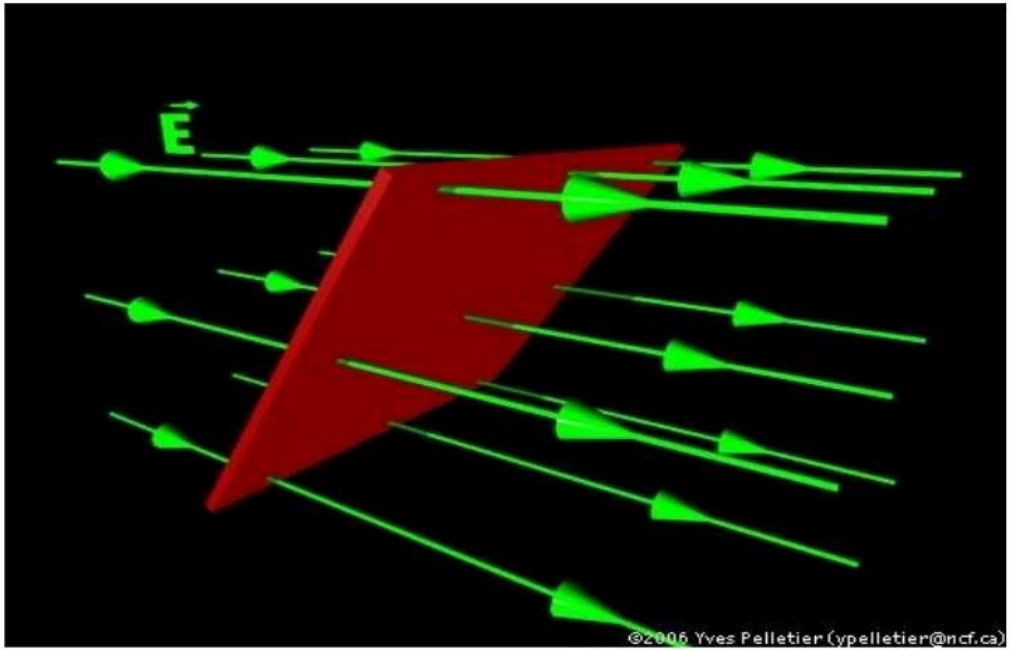
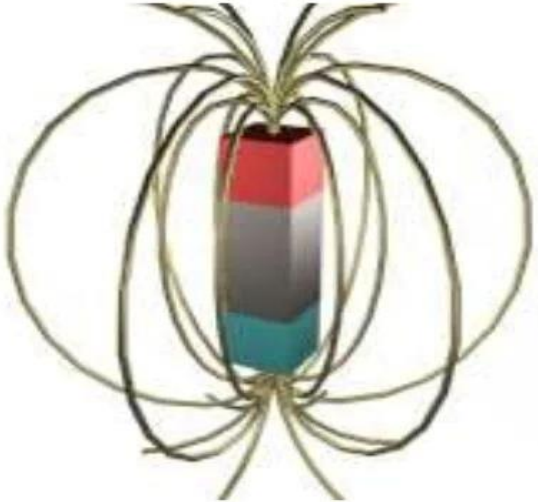
What is flux

- The flow of energy through a surface.
- In electronics, the term applies to any electrostatic field and any magnetic field . Flux is called as "lines" in a plane that contains or intersects electric charge poles or magnetic poles.

Electric flux



Magnetic flux

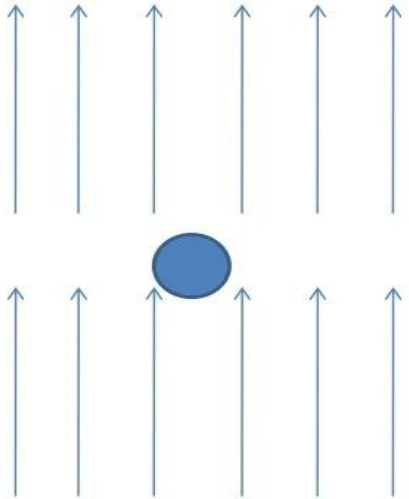


WHAT IS DIVERGENCE

- Divergence is an operation which is performed on vector and that results in scalar quantity.
- It tells how much flux is entering or leaving a small volume(or a point) per unit volume.
- divergence is just the net flux per unit volume, or “flux density”.
  - Divergence = Flux / Volume.
  - It states that the sum of all sources minus the sum of all sinks gives the net flow out of a region

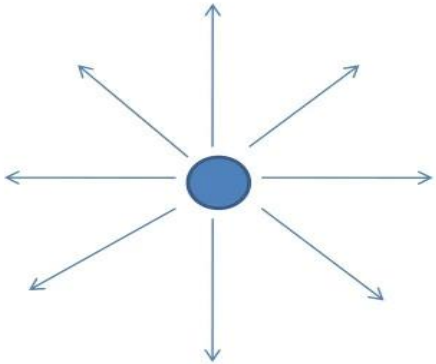
Types of Divergence

- Zero Divergence
  - No net flux inside the region or volume.



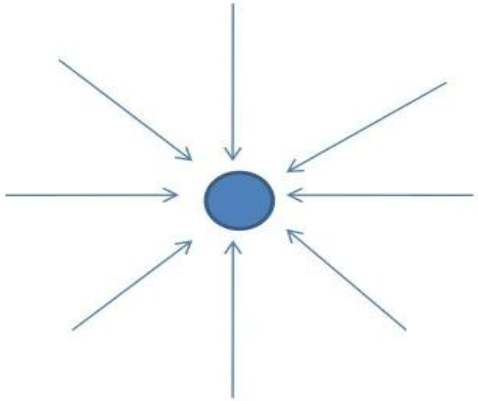
Types of Divergence

- POSITIVE DIVERGENCE
  - Divergence of vector field is positive if vector diverges or spread out from given point.



Types of Divergence

- Negative Divergence
  - Divergence of vector field is called negative if vector converges at that given point.



Divergence of Vector Field

- Divergence of vector field $\vec{A}$ is measure of how much a vector field converges to or diverges from a given point in volume.

- The divergence of a vector field $\vec{A}$ is defined as

$$\text{Div } A = \nabla \cdot \vec{A}$$

DEL OPERATOR

- "del operator", usually denoted by the symbol▼ (which is called the "nabla"). This can be regarded as a vector whose components in the three principle directions of a Cartesian coordinate system(or any other) are partial differentiations with respect to those three directions(x,y,z) or any other

DEL OPERATOR

- the del operator can be expressed as

$$\nabla = \mathbf{i}\frac{\partial}{\partial x} + \mathbf{j}\frac{\partial}{\partial y} + \mathbf{k}\frac{\partial}{\partial z}$$

Letting **i**, **j**, **k** denote the basis vectors in the x,y,z directions.


The End