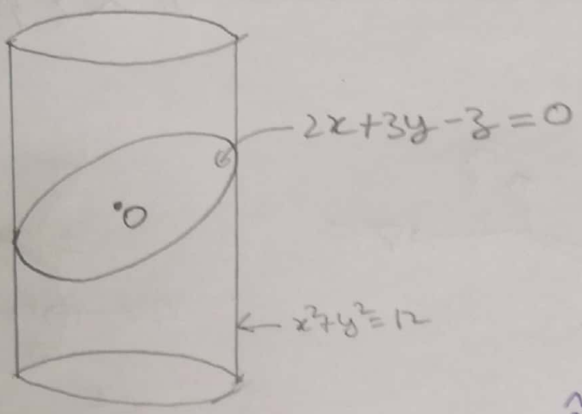
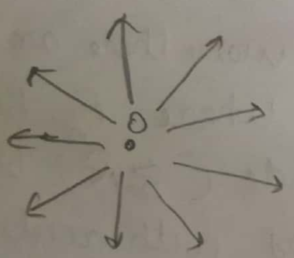
Geometric interpretation of line integral of given vector field.

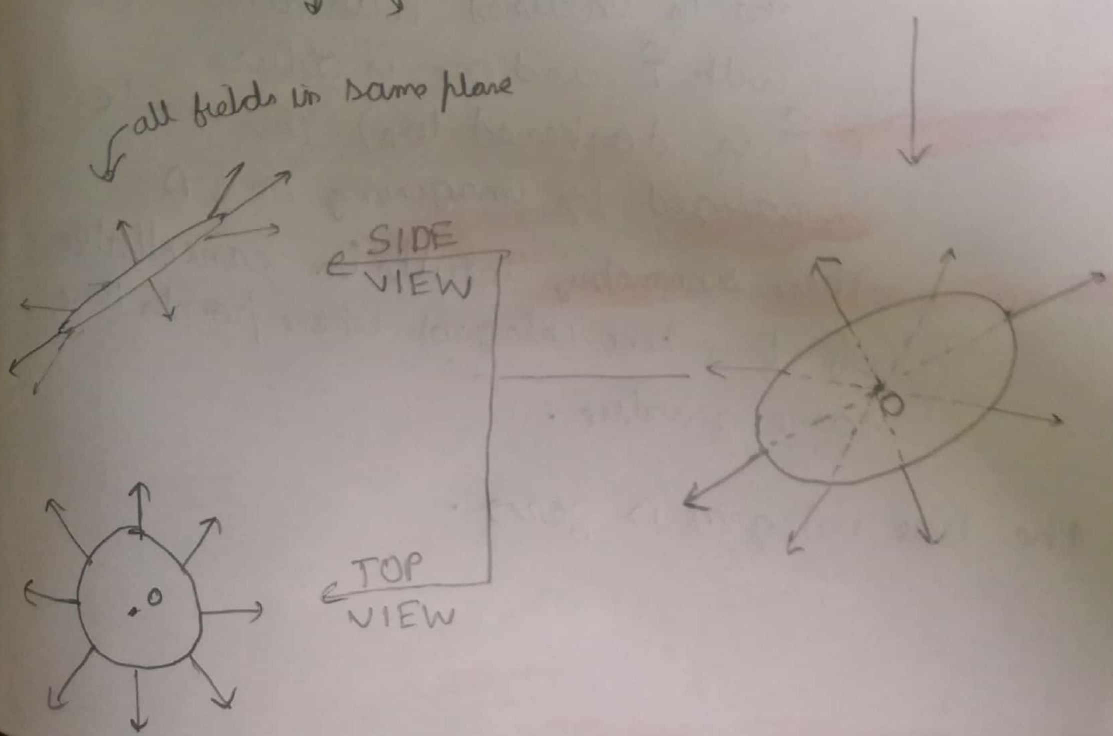


Now, given that the field vector is $x\hat{i}+y\hat{j}+z\hat{k}$ i
i.e) If we consider any point in the space, the field there basically points in the direction of line joining point and origin (Radial direction)

∴ Field ÷

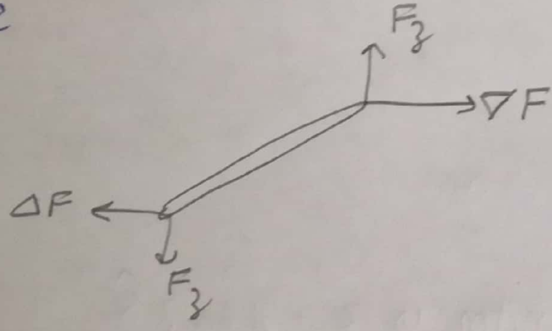


. Now using this fact, we can draw field lines on each point of the given ellipse.

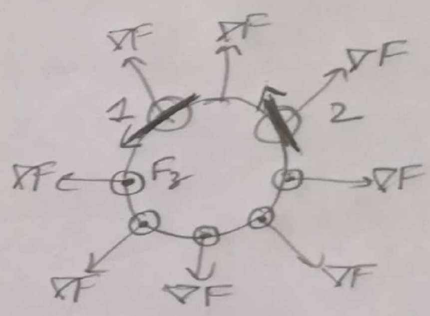


Now, at each and every point of the ellipse, the field can be split into two components i.e) one parallel to ∇F and other Perpendicular to X Y plane.

i-e



SIDE VIEW



TOP VIEW

Now, in top view, we can see that ~~$\nabla F \cdot T$~~

0 (we know before)

$$(F \cdot T) ds = \left(\vec{F}_z \cdot \hat{T} + \cancel{\vec{\nabla F} \cdot \hat{T}} \right) . ds$$

Now in Top view there are two points 1, 2 where F_z has same magnitude ($z\hat{k}$) but one is inclined with acute angle with $\hat{T}$ and one is obtuse ($\hat{T}$ is darkened line) This can be realized by imagining in 3-D.

These symmetry results in cancellation of ~~[illegible]~~ line integral where points have same z value.

Hence the line integral is zero.