

Answer on Question #77462, Physics / Electromagnetism | for completion

Dear expert, please provide an answer to the question below within 12 hours.

$$F(r) = (2pxy)\mathbf{i} + (3qyz^2 - py^2)\mathbf{j} - (qz^3)\mathbf{k}$$

Where p and q are constants. ($\mathbf{i}, \mathbf{j}, \mathbf{k}$ are the vectors, couldn't seem to do $\hat{}$ above them)

Show this is a solenoidal field.

Solution:

To prove that F is solenoidal field we need to show that $\text{div } F = 0$.

$$\text{div } F = \frac{\partial}{\partial x}(2pxy) + \frac{\partial}{\partial y}(3qyz^2 - py^2) + \frac{\partial}{\partial z}(-qz^3) = 2py + 3qz^2 - 2py - 3qz^2 \equiv 0.$$

We have proved that F is solenoidal field.

Answer provided by <https://www.AssignmentExpert.com>