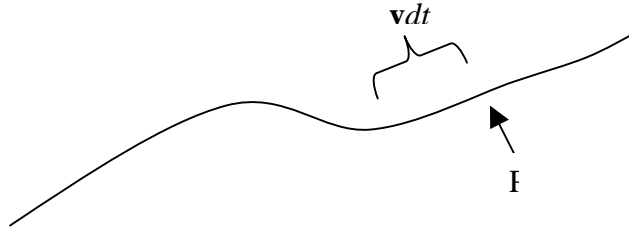


Hint for Problem 3, Pset 6.



A line charge λ traveling down a wire at speed v constitutes a current

$$I = \lambda v$$

Because a segment of length $v dt$, carrying charge $\lambda v dt$, passing point P in a time interval dt . Current is

$$I = \frac{dq}{dt} = \lambda v$$

Force on a line segment is

$$d\mathbf{F} = \frac{dq}{c} \mathbf{v} \times \mathbf{B} = \frac{\lambda dl}{c} \mathbf{v} \times \mathbf{B} = \frac{dl}{c} \mathbf{I} \times \mathbf{B}$$

Since \mathbf{I} and $d\mathbf{l}$ both point in the same direction,

$$d\mathbf{F} = \frac{I}{c} d\mathbf{l} \times \mathbf{B}$$