Electric Current (H.1)

20160701

Based on
Engineering Electromagnetics
Hayt & Buck

$$E_\rho = \frac{\rho_L}{2\pi\epsilon_0\rho}$$

$$\mathbf{E} = \frac{\rho_L}{2\pi\epsilon_0\rho}\,\mathbf{a}_\rho$$

$$\mathbf{E} = \frac{\rho_S}{2\,\epsilon_0}\,\mathbf{a}_N$$

$$I = \int_S \mathbf{J} \cdot d\mathbf{S}$$

$$\mathbf{J} = \rho_v \mathbf{v}$$

$$(\nabla \cdot \mathbf{J}) = -\frac{\partial \rho_v}{\partial t}$$

$$\mathbf{J} = -\rho_e \mu_e \mathbf{E}$$

$$\mathbf{J} = \sigma \mathbf{E}$$

$$\sigma = -\rho_e \mu_e$$

$$V = I R$$

$$R = \frac{L}{\sigma S}$$

$$D_t = E_t = 0$$

$$D_N = \varepsilon_0 E_N = \rho_s$$

$$\sigma = -\rho_e \mu_e + \rho_h \mu_h$$