



$$\otimes \vec{B} = \frac{\mu_0 I}{2\pi y} \hat{e}_x$$

$$d\phi_B = \vec{B}(y) \cdot \vec{a} dy$$

$$\Phi_B = \int_s^{s+a} \frac{\mu_0 I a}{2\pi y} dy = \frac{\mu_0 I a}{2\pi} \ln \left| \frac{s+a}{s} \right| = \frac{\mu_0 I a}{2\pi} \ln \left| 1 + \frac{a}{s} \right|$$

$$\phi_B(t) = \frac{\mu_0 I a}{2\pi} \ln \left| 1 + \frac{a}{s+vt} \right|$$

$$\mathcal{E}_{ind} = -\frac{d\phi_B}{dt} = -\frac{\mu_0 I a}{2\pi} \frac{a \frac{-v}{(s+vt)^2}}{1 + \frac{a}{s+vt}} = \frac{\mu_0 I a^2 v}{2\pi (s+vt+a)(s+vt)}$$

$$\mathcal{E}_{ind}(0) = \frac{\mu_0 I a^2 v}{2\pi (s+a)s}$$