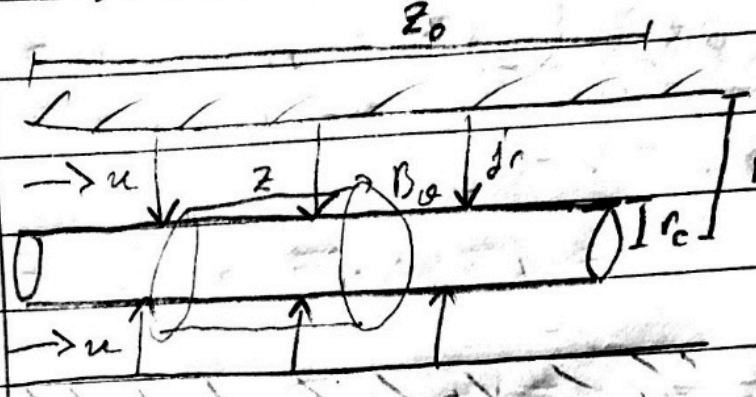
MPD ID Induced Field



$$\oint \vec{B} \cdot d\vec{l} = \mu_0 \int_z^{z_0} \vec{J} \cdot d\vec{S}$$

$2\pi r \hat{\theta}$ $\qquad$ $2\pi r (z_0 - z)$

$$2\pi r B = \mu_0 \left(j \, 2\pi r \, z_0 \right) (1 - z/z_0)$$

$$\Rightarrow \boxed{B_\theta = \frac{\mu_0 j}{2\pi r} (1 - z/z_0)}$$

Induced $\vec{B}$ in MPD

Handeling Sonic Pt. !

$$\frac{du}{dz} = \frac{-\sigma u (\partial B_{z_0}/\partial z)^2 r^2}{4F \left[1 - \left(\left(\frac{\gamma - 1}{\gamma} \right) + P/Fu \right) \right]}$$

$$\frac{dP}{dz} = -\left[\left(\frac{\gamma - 1}{\gamma} \right) F + \frac{P}{u} \right] \frac{du}{dz}$$

→ coming from supersonic to subsonic