

Ex 14-2

B-field inside cylindrical conductor with current density

$$J = J_0 \frac{r^2}{R^2}$$

$$\oint \underline{B} \cdot d\underline{l} = \mu_0 I_{enc} = \mu_0 \int \underline{J} \cdot d\underline{S}$$

$$dS = 2\pi r \, dr$$

$$\oint \underline{B} \cdot d\underline{l} = \frac{\mu_0 J_0}{R^2} \int_0^r r^2 \cdot 2\pi r \, dr$$



$$B \cdot 2\pi r = \frac{2\pi \mu_0 J_0}{R^2} \frac{r^4}{4}$$

$$B = \frac{\mu_0 J_0}{4 R^2} r^3$$

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