

## 1. Magnetfeld eines asymmetrischen Leiters

a)  $r = \sqrt{x^2 + y^2}$

$$I_+ = I \left(1 + \frac{a^2}{R^2}\right)$$

$$I_- = -I \frac{a^2}{R^2}$$

$$B_+ = \frac{\mu_0 I_+}{2r\pi} = \frac{\mu_0 I_+}{2\pi \sqrt{x^2 + y^2}}$$

$$B_- = \frac{\mu_0 I_-}{2r\pi} = \frac{\mu_0 I_-}{2\pi \sqrt{(x-b)^2 + y^2}}$$

$$B = B_+ + B_- = \frac{\mu_0 I_+}{2\pi \sqrt{x^2 + y^2}} + \frac{\mu_0 I_-}{2\pi \sqrt{(x-b)^2 + y^2}} =$$

$$= \frac{\mu_0 I}{2\pi} \left[ \frac{1}{\sqrt{x^2 + y^2}} + \frac{a^2}{R^2} \left( \frac{1}{\sqrt{x^2 + y^2}} - \frac{1}{\sqrt{(x-b)^2 + y^2}} \right) \right]$$

$$\underline{\underline{B(2R, 0) = \frac{\mu_0 I}{4R\pi} \left[ 1 + \frac{a^2}{R} \left( \frac{1}{R} - \frac{1}{R-b} \right) \right]}}$$

b)

$$\underline{\underline{B(0, 2R) = \frac{\mu_0 I}{2R\pi} \left[ \frac{1}{2} + \frac{a^2}{R} \left( \frac{1}{2R} - \frac{1}{\sqrt{b^2 + 4R^2}} \right) \right]}}$$

## 2. Induktion

a)

b)

## 3. Induktionsspannung - Stab

a)

b)