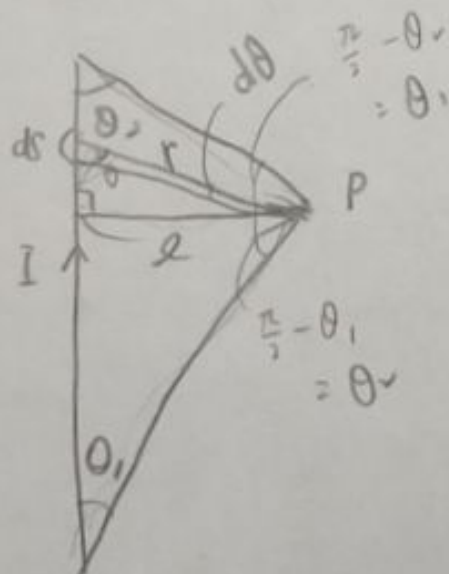


第4回課題

P.123



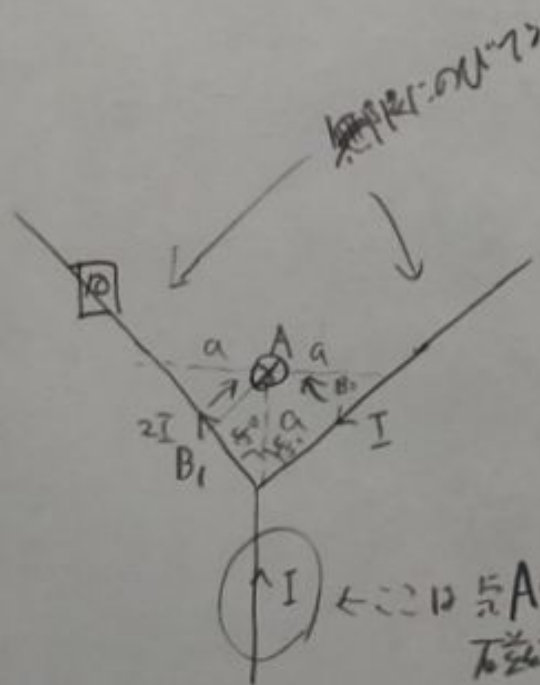
$$dB = \frac{\mu_0}{4\pi} \cdot \frac{IdS}{r^2} \sin\theta \quad \dots \text{微小部分の電流が点Pにつくる磁束密度}$$

$$B = \int dB = \frac{\mu_0}{4\pi} \int \frac{I \sin\theta}{r^2} ds \quad \dots \text{電流全体での磁束密度}$$

$$\therefore r \sin\theta = l, \quad ds \sin\theta = r \cos\theta d\theta = r d\theta$$

$$B = \frac{\mu_0}{4\pi} \int_{\theta_1}^{\pi - \theta_1} \frac{\sin\theta}{l} d\theta$$

$$= \frac{\mu_0 I}{4\pi l} (\cos\theta_1 + \cos\theta_1)$$



電流Iがつくる電場

$$B = \frac{\mu_0 I}{4\pi l} (\cos\theta_1 + \cos\theta_1) \quad (2F)$$

$$B_1 = \frac{\mu_0 2I}{4\pi (\frac{a}{\sqrt{2}})} (\cos 45^\circ + \cos 0^\circ) \quad \leftarrow \theta_1 \text{は0 (無限に導線からの距離は無限大)}$$

$$= \sqrt{2} \frac{\mu_0 I}{2\pi a} \left(1 + \frac{\sqrt{2}}{2}\right)$$

$$B_2 = \frac{\mu_0 I}{4\pi (\frac{a}{\sqrt{2}})} (\cos 0^\circ + \cos 45^\circ)$$

$$= \frac{\sqrt{2} \mu_0 I}{4\pi a} \left(1 + \frac{\sqrt{2}}{2}\right)$$

$$B = B_1 + B_2$$

$$= \frac{3\sqrt{2} \mu_0 I}{4\pi a} \left(1 + \frac{\sqrt{2}}{2}\right)$$

ここは5Aの磁場に関係ない
図の式+1

合成する