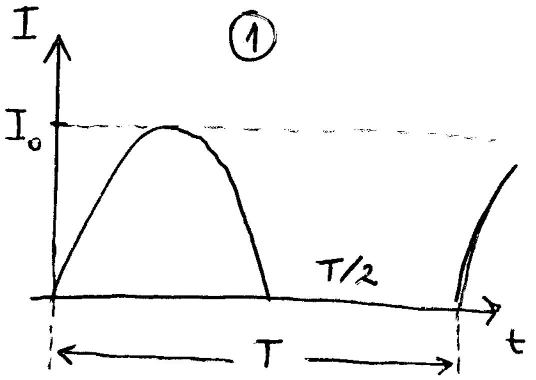
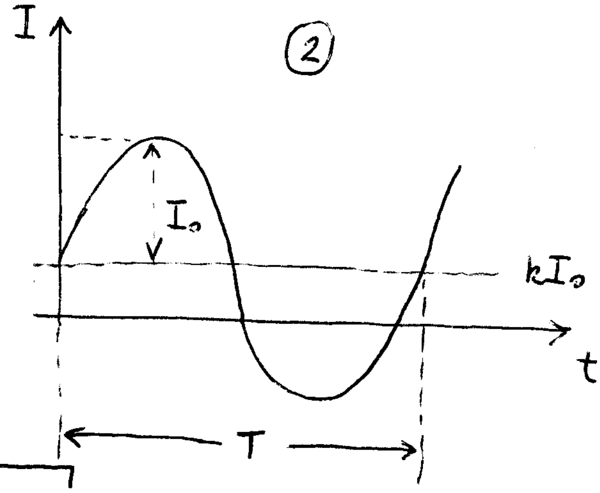
34.) $I_{eff} = ?$





$$\int_0^T I^2 R\,dt = I_{eff}^2 R T \rightarrow I_{eff} = \sqrt{\frac{1}{T}\int_0^T I^2 dt}$$

①

$$\left.\begin{aligned} I_{eff}^2 &= \frac{1}{T}\int_0^T I^2 dt = \frac{I_0^2}{T}\int_0^{T/2} \sin^2\left(\frac{2\pi t}{T}\right) dt \\ &= \frac{I_0^2}{T}\int_0^{T/2} \cos^2\left(\frac{2\pi t}{T}\right) dt \end{aligned}\right\} + \;= 2 I_{eff}^2$$

$$\sin^2\alpha + \cos^2\alpha = 1$$

$$I_{eff}^2 = \frac{I_0^2}{2T}\int_0^{T/2} 1\,dt = \frac{I_0^2}{2T}\,\frac{T}{2}$$

$I_{eff} = \ldots$

②

$$I_{eff}^2 = \frac{1}{T}\int_0^T I^2 dt = \frac{1}{T}\int_0^T \left(I_0 \sin\left(\frac{2\pi t}{T}\right) + kI_0\right)^2 dt =$$

$$= \frac{I_0^2}{T}\int_0^T \left(\sin^2\left(\frac{2\pi t}{T}\right) + 2k\sin\left(\frac{2\pi t}{T}\right) + k^2\right) dt$$

$$= \frac{I_0^2}{T}\underbrace{\int_0^T \sin^2\left(\frac{2\pi t}{T}\right) dt}_{\int_0^T \cos^2\left(\frac{2\pi t}{T}\right) dt\,!} + 0 + \frac{I_0^2}{T}k^2 T = \frac{I_0^2}{T}\,\frac{T}{2} + I_0^2 k^2$$

$I_{eff} = \ldots$