D: $f = 50 \frac{obr}{min}$

$n = f$ - częstość

B

S

$$\Phi(t) = \vec{B} \circ \vec{S} = BS\cos\measuredangle(\vec{B}, \vec{S}) =$$
$$= BS\cos\alpha$$

$$\omega = \frac{\alpha}{t} \Rightarrow \alpha = \omega t$$

$$\Phi(t) = BS\cos(\omega t)$$

$$\omega = \frac{2\pi}{T} = 2\pi f = 2\pi n$$

$$\Phi(t) = BS\cos(2\pi n t)$$

Wychodzimy od tego równania:

$$\mathcal{E} = -\frac{\Delta\Phi}{\Delta t}$$

Przechodzimy granicą $\Delta t \to 0$

$$\mathcal{E}(t) = -\lim_{\Delta t \to 0} \frac{\Delta\Phi(t)}{\Delta t} = -\Phi'(t)$$

$$\Phi(t) = BS\cos\alpha$$

$$\omega = \frac{\alpha}{t} \Rightarrow \alpha = \omega t$$

$$\Phi(t) = BS\cos(\omega t)$$

$$\Phi'(t) = BS \cdot (\cos(\omega t))' =$$
$$= BS \cdot (-\sin(\omega t) \cdot \omega)$$
$$= -BS\omega\sin(\omega t)$$

$$\mathcal{E}(t) = -(-BS\omega\sin(\omega t))$$

$$\mathcal{E}(t) = BS\omega\sin(\omega t)$$

Będziemy chcieli zmienić argument całkowania:

$$\boxed{\begin{aligned} d(\omega t) &= \omega \cdot d(t) \\ d(t) &= \frac{d(\omega t)}{\omega} \end{aligned}}$$

$$\varepsilon = -\phi'(t) = BS\omega \cdot \text{sim}(\omega t) \quad \Big/ \int$$

$$\int -\phi'(t)\,\cancel{dt} = \int BS\omega \sin(\omega t)\,dt$$

$$-\phi(t) = \int BS\omega \,\text{sim}(\omega t)\,\frac{d(\omega t)}{\omega} =$$

$$= \int BS\,\text{sim}(\omega t)\,d(\omega t) =$$

$$= BS \int \text{sin}(\omega t)\,d(\omega t) =$$

$$= BS \cdot (-\cos(\omega t)) = -BS\cos(\omega t)$$

$$\omega = \frac{\alpha}{t} \Rightarrow \alpha = \omega t$$

$$-\phi(t) = -BS\cos\alpha$$

$$\phi(t) = BS\cos\alpha$$