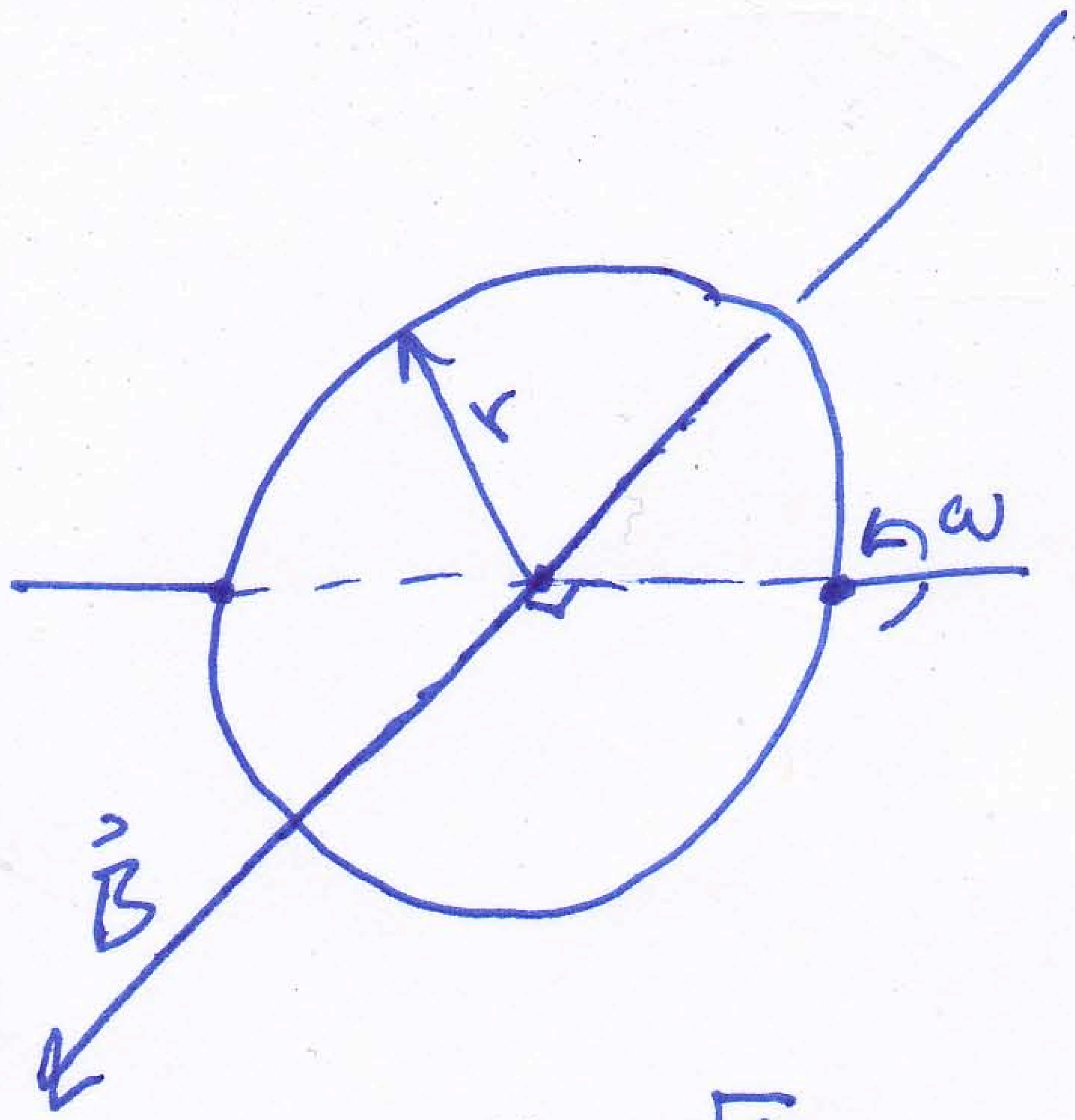


$r(t) = \sqrt{t}$

$$\mathcal{E} = -N\frac{d\Phi_B}{dt}$$

$$\Phi_B = \int B\cdot dA, \quad B\cdot dA = B\,dA\sin(\theta), \quad \theta = \omega t$$

$$= \int B\,dA\sin(\omega t)$$

$$= B\sin(\omega t)\int dA = B\sin(\omega t)A(t)$$

$$A(t) = \pi(r(t))^2 = \pi(\sqrt{t})^2 = \pi t$$

$$\Phi_B = B\pi t\sin(\omega t)$$

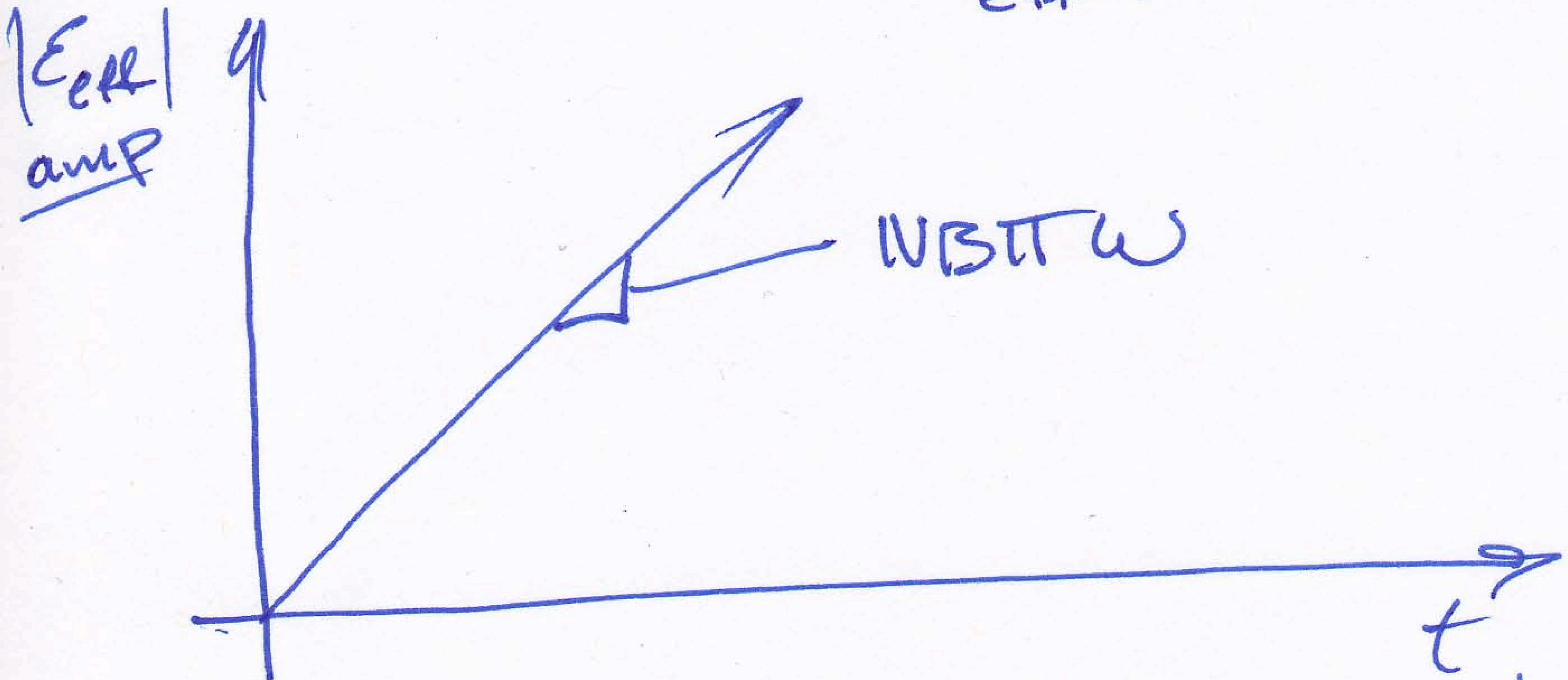
$$\mathcal{E} = -N\frac{d\Phi_B}{dt} = -NB\pi\frac{d}{dt}(t\sin(\omega t))$$

$$= -NB\pi(\underbrace{\sin(\omega t)}_{0 \leftrightarrow 1} + \underbrace{t\omega}_{\text{linear}}\cos(\omega t))$$

in long term small

$$\mathcal{E}_{\cancel{act}\ eff} \approx \underbrace{-NB\pi(t\omega}_{\text{amplitude}}\cos(\omega t))$$

Amplitude of $|\mathcal{E}_{\cancel{act}\ eff}| = +NB\pi t\omega$



if $R(r) = 2\pi r(t)\lambda$, λ = resistance density

$$= 2\pi\sqrt{t}\lambda$$

find $i(t)$: (use $\mathcal{E}_{eff}$)

$$i_{eff}(t) = \frac{\mathcal{E}(t)}{R(t)} = \frac{-NB\pi(t\omega\cos(\omega t))}{2\pi\sqrt{t}\lambda} = \frac{-NB\cancel{\pi}\omega}{2\cancel{\pi}\lambda}\cos(\omega t)\cdot\frac{t}{\sqrt{t}}$$

$$i_{eff}(t) = \frac{-NB\omega}{2\alpha}\cos(\omega t)\cdot\sqrt{t}$$

$$= \underbrace{\frac{-NB\omega}{2\alpha}\sqrt{t}}_{\text{amplitude}}\cos(\omega t)$$

$$\left|i_{eff}(t)_{amp}\right| = +\frac{NB\omega}{2\alpha}\sqrt{t}$$