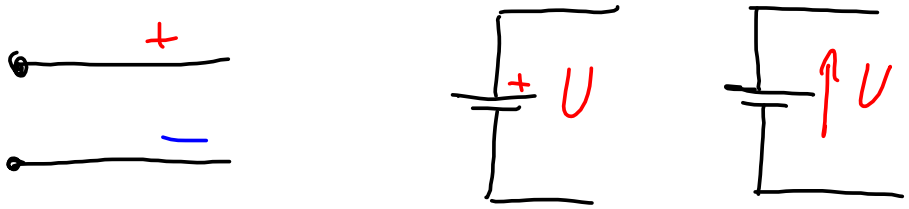
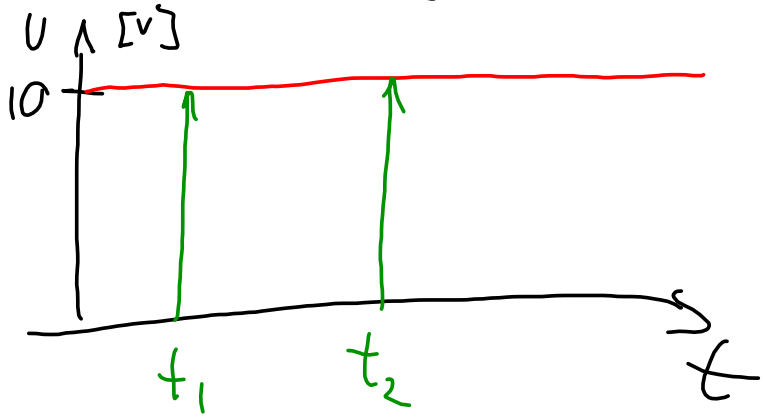
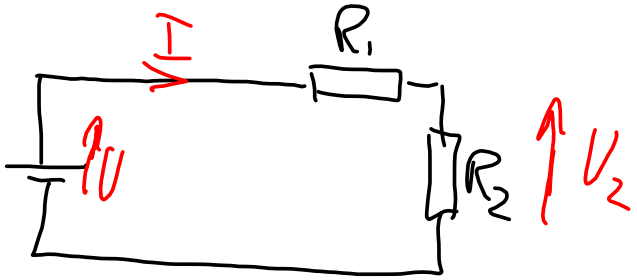
Likespenning



Eks: $U = 10\,[V]$

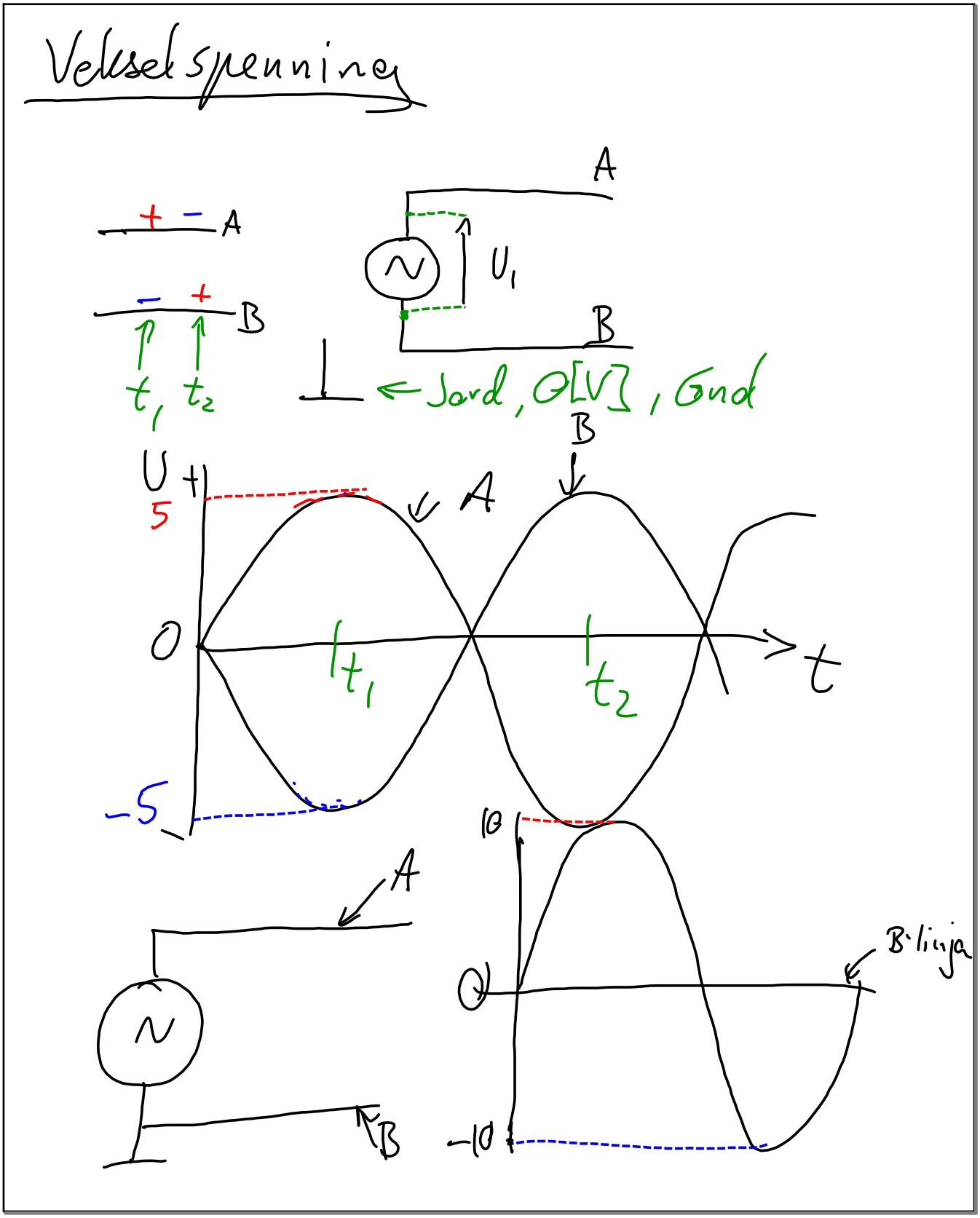


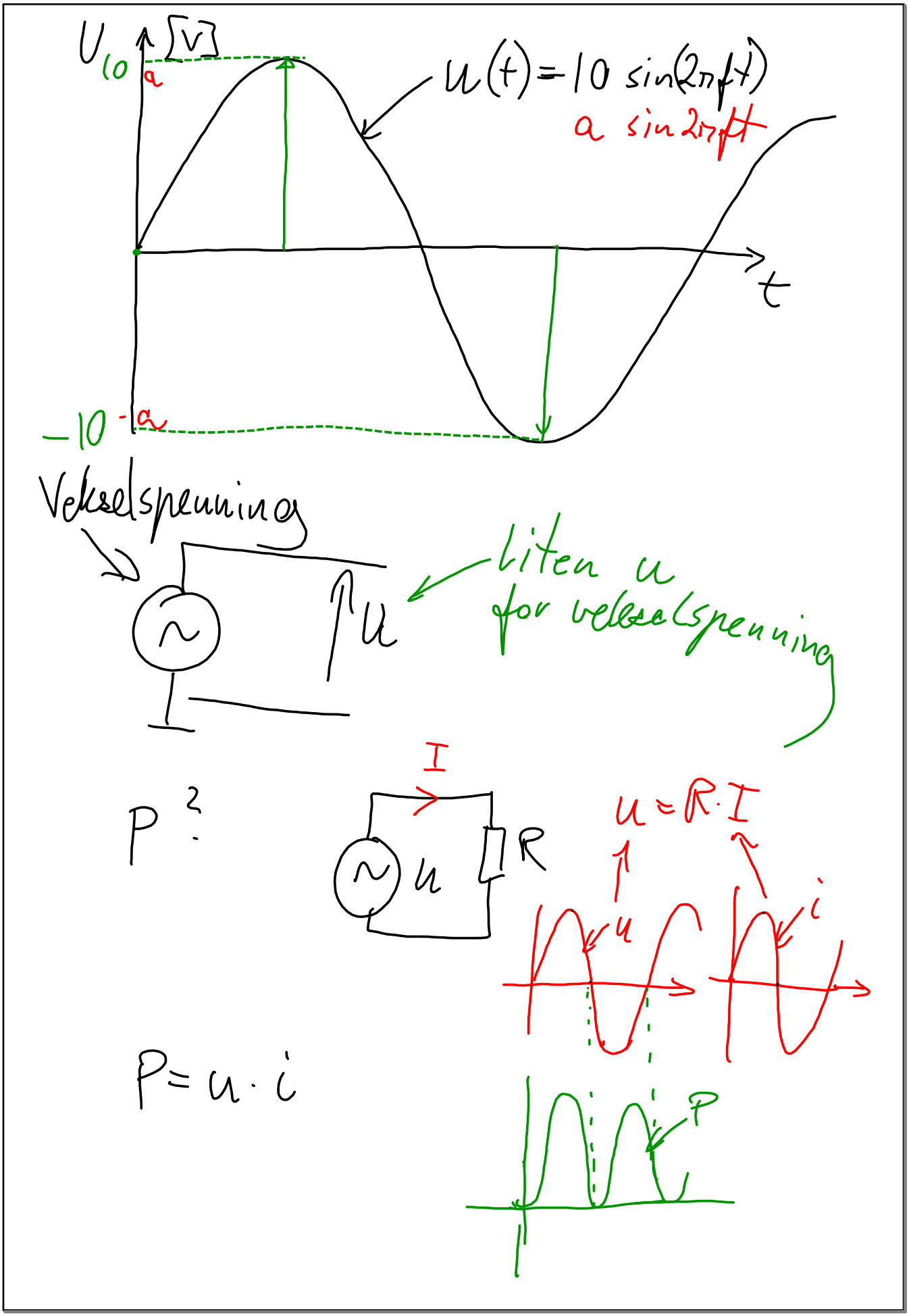


$$P = U \cdot I$$

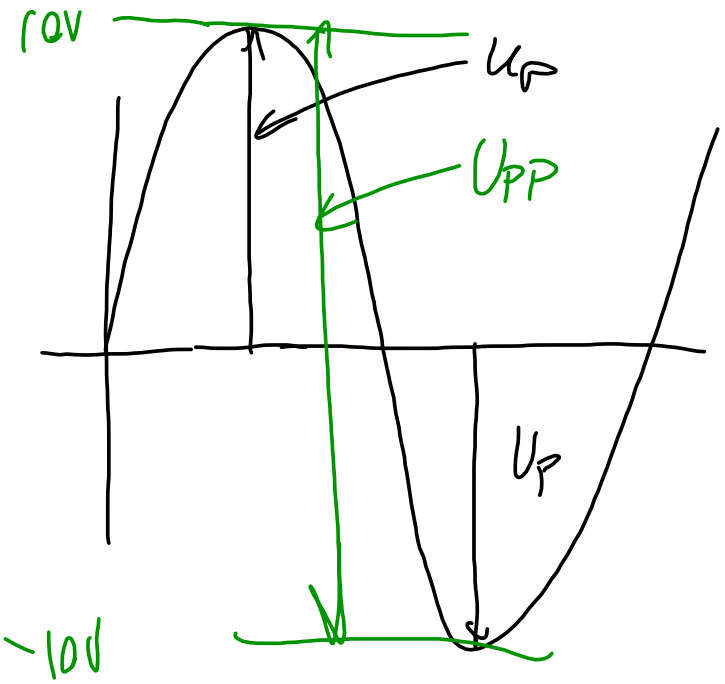
$$P_{R2} = U_2 \cdot \underbrace{I}_{\frac{U_2}{R_2}} = \frac{U_2^2}{R_2}$$

Vekselspenning




U_{10} [V]
a
$u(t) = 10 \sin(2\pi f t)$
$a \sin 2\pi f t$
t
-10 -a
Vekselspenning
u
liten u for vekselspenning
P ?
I
R
u
$u = R \cdot I$
u
i
P
$P = u \cdot i$

$$U_{rms} = \frac{U_p}{\sqrt{2}}$$

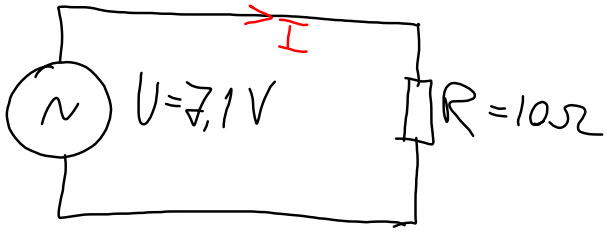


$U_p = 10\ V$

$U_{pp} = 2 \cdot U_p = 20V$

$U_{Rms} = \frac{10V}{\sqrt{2}} = 7,07V$

Det er rms verdien som brukes for å angi størrelsen på vekselspenning



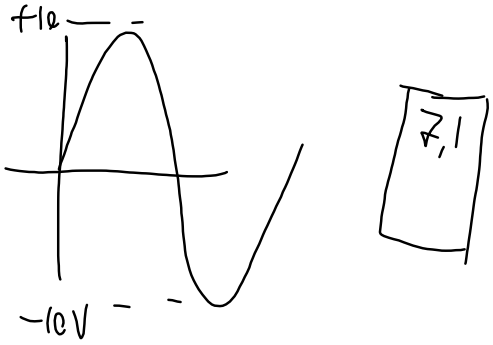
$$I = \frac{U}{R} = \frac{7{,}1\,[V]}{10\,[\Omega]} = 0{,}71\,[A]$$

$$P = 7{,}1\,[V] \cdot 0{,}71\,[A] = 5{,}0\,[W]$$

V_{rms} I_{rms}

Et multimeter viser rms verdien

Et oscilloscop viser toppen til til u

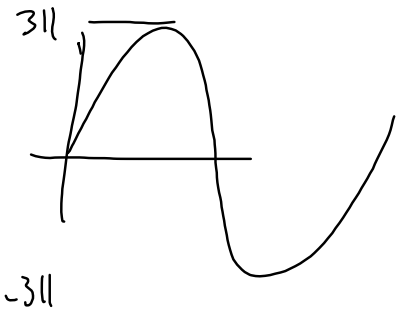


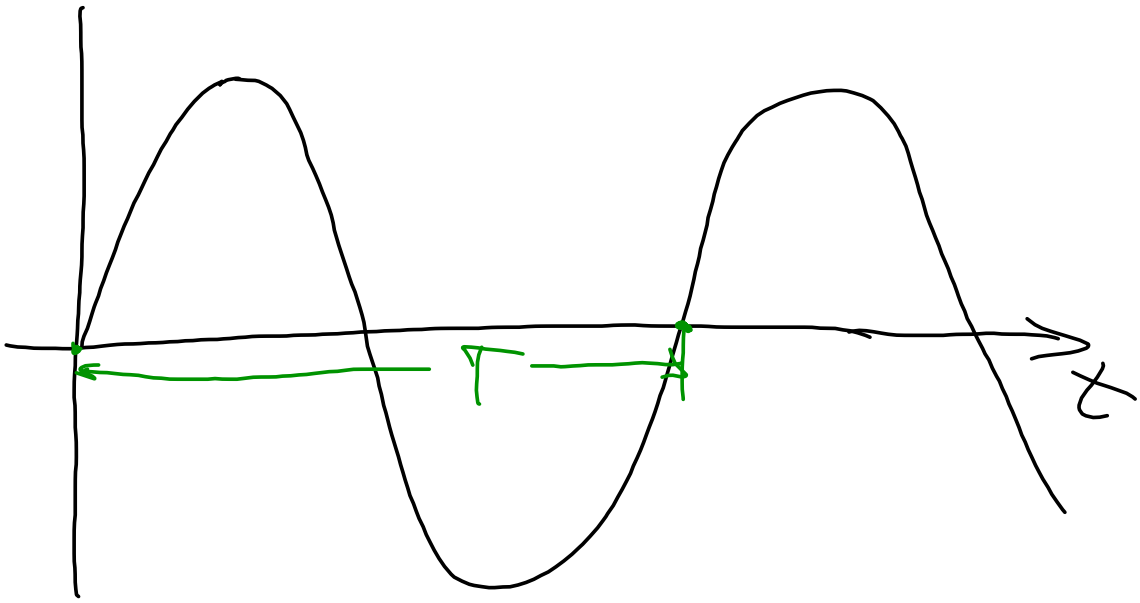
multimeteret

220[V]

$$V_{rms} \cdot \sqrt{2} = V_p = 220V \cdot 1{,}4 = 311\ V$$

$$V_{pp} = 2 \cdot V_p = 2 \cdot 311 = 622\ V$$





T : Periodetid

Periode

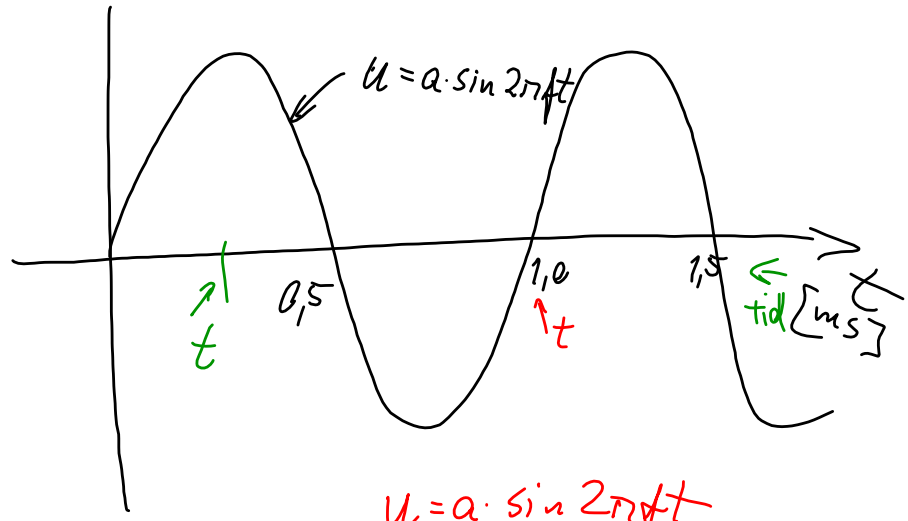
f : frekvens : $f = \frac{1}{T}$

Eks: $T = 1{,}0\,[ms] = 1{,}0 \cdot 10^{-3}\,[s]$

$f = \frac{1}{T} = \frac{1}{1{,}0 \cdot 10^{-3}\,[s]} = 1{,}0 \cdot 10^{3}\,[\frac{1}{s}]$

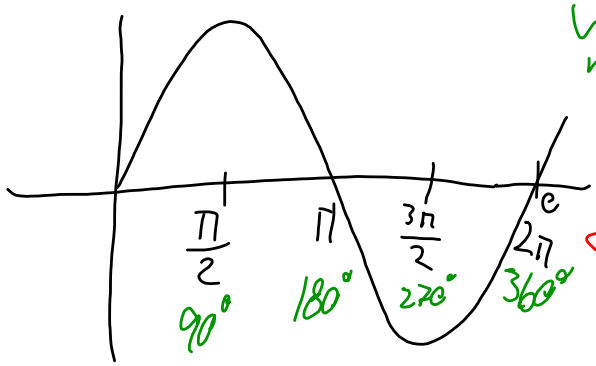
$= 1000\,[Hz] = 1{,}0\,kHz$

↓ Hz



$u = a \cdot \sin 2\pi ft$

vinkel



"$2\pi ft$" → "konvertering fra tid til vinkel"

$f = \frac{1}{T}$

$2\pi ft = 2\pi \cdot \frac{t}{T}$

$t = T \quad 2\pi \cdot \frac{T}{T} = 2\pi$

$t = \frac{T}{4} \quad 2\pi \cdot \frac{\frac{T}{4}}{T} = 2\pi \cdot \frac{1}{4} = \frac{\pi}{2}$

Eks:

$u(t) = a \cdot \sin 2\pi ft$

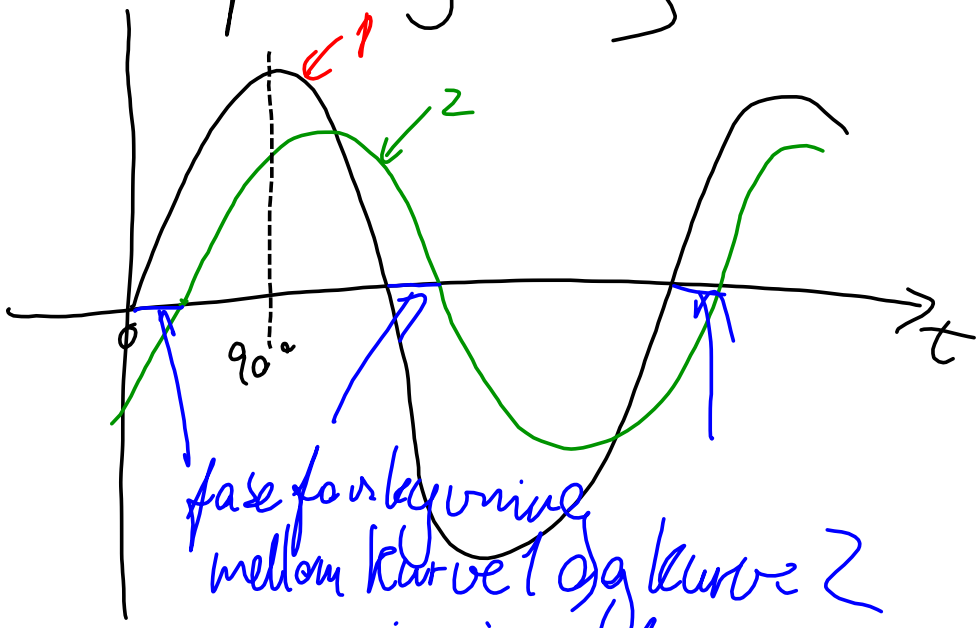
$f = 1000\ Hz$

Hva er spenningen ved $t_1 = 0{,}25\ ms$

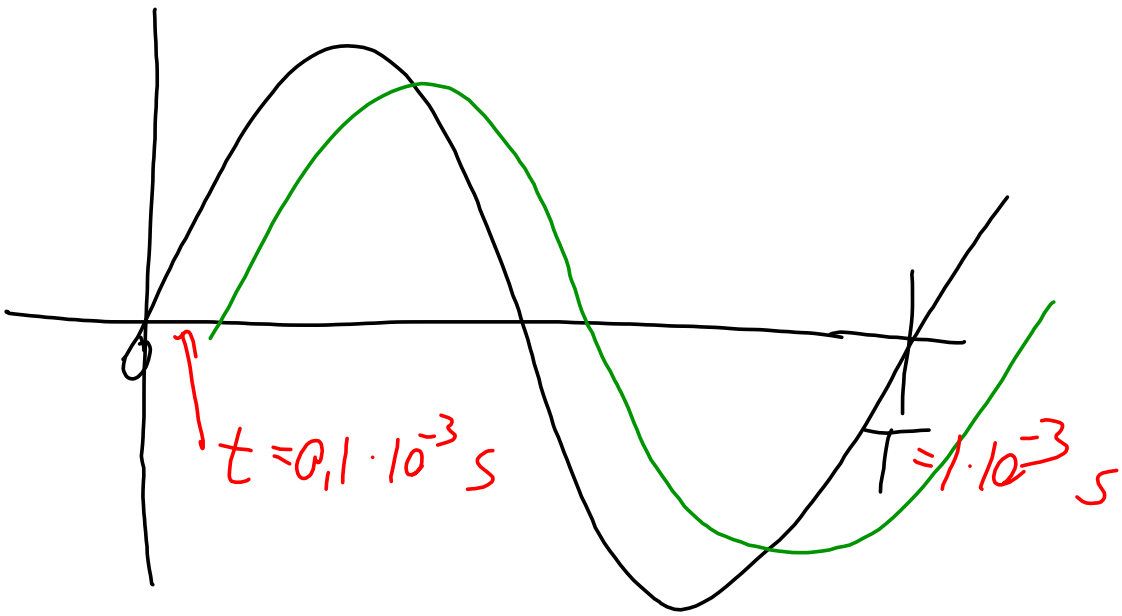
$u(t) = a \cdot \sin\left(1000\left[\frac{1}{s}\right] \cdot 0{,}25 \cdot 10^{-3}[s] \cdot 2\pi\right)$

$a \cdot \sin(0{,}25 \cdot 2\pi) = a \cdot \sin\frac{\pi}{2} = a$

Faseforskyvning

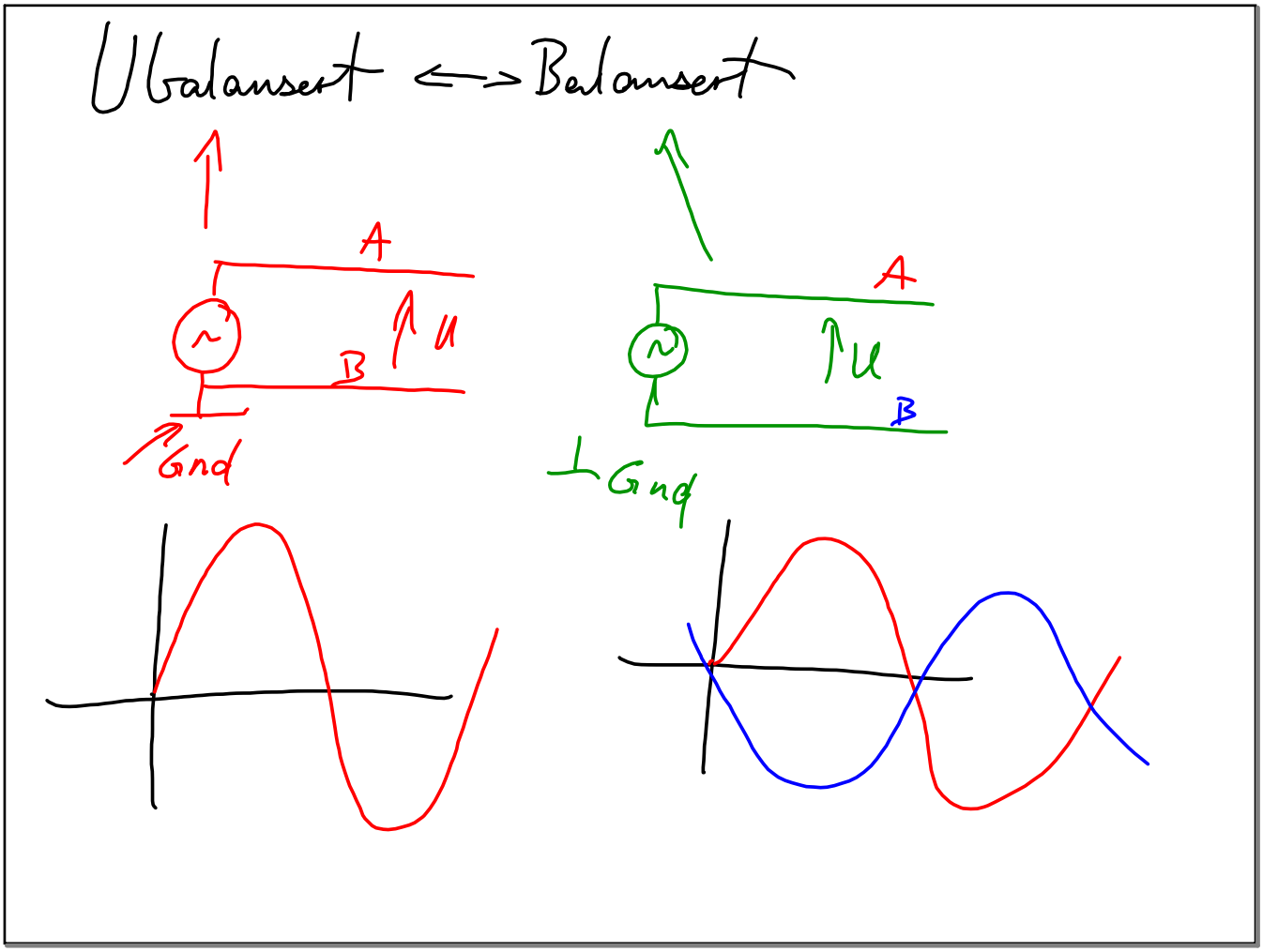


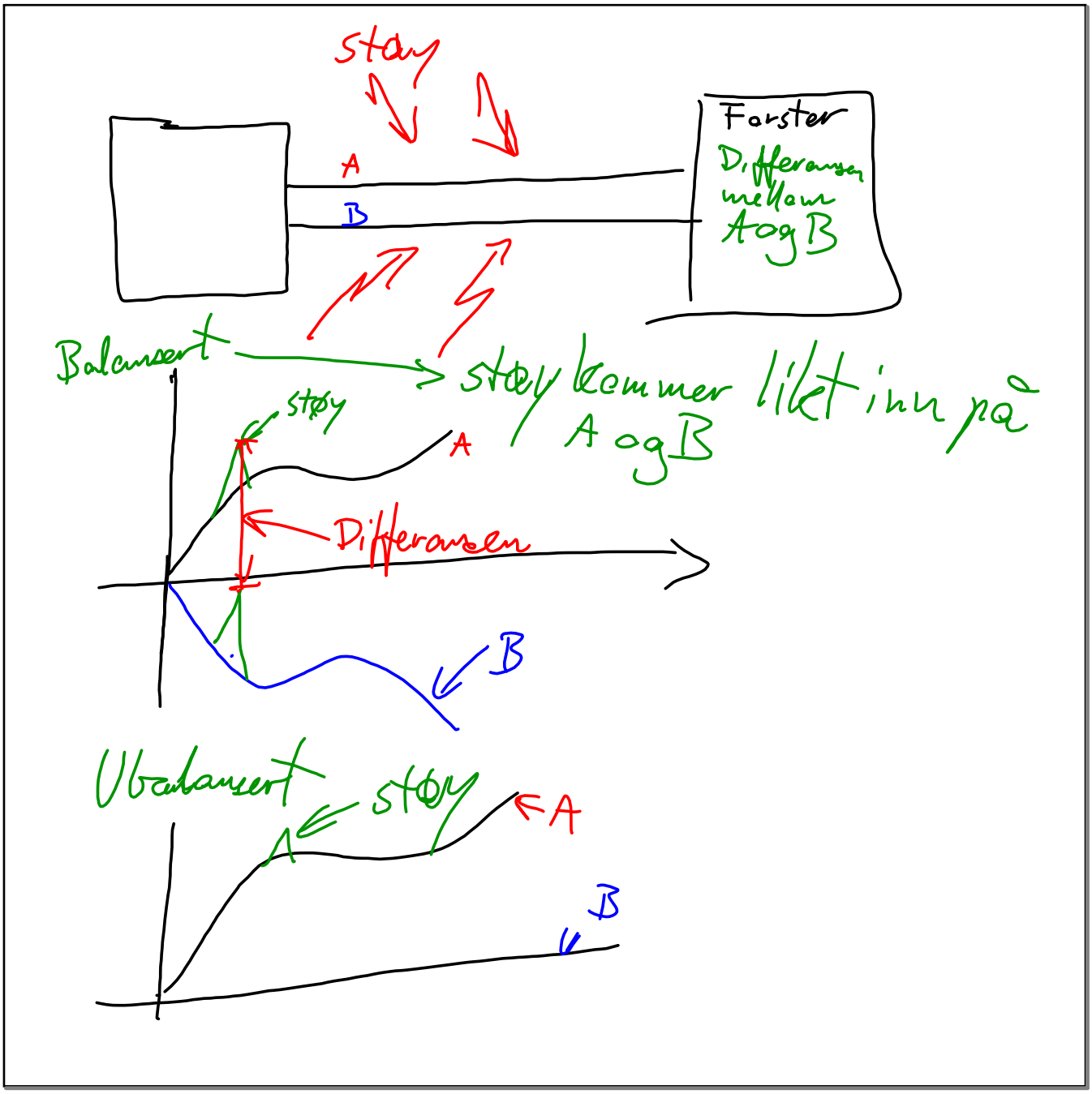
faseforskyvning mellom kurve 1 og kurve 2 langs i grader



$$T = \frac{1}{f} = \frac{1}{1000\,[Hz]} = 1 \cdot 10^{-3}\,[s]$$

$$\frac{t}{T} \cdot 360^\circ = \frac{0{,}1 \cdot 10^{-3}}{1{,}0 \cdot 10^{-3}} \cdot 360^\circ = 0{,}1 \cdot 360^\circ = 36^\circ$$


Ubalansert <-> Balansert
A
B
U
Gnd
A
U
B
Gnd


Støy
A
B
Forsker
Differansen mellom A og B
Balansert
støy kommer likt inn på A og B
støy
A
Differansen
B
Ubalansert
støy
A
B