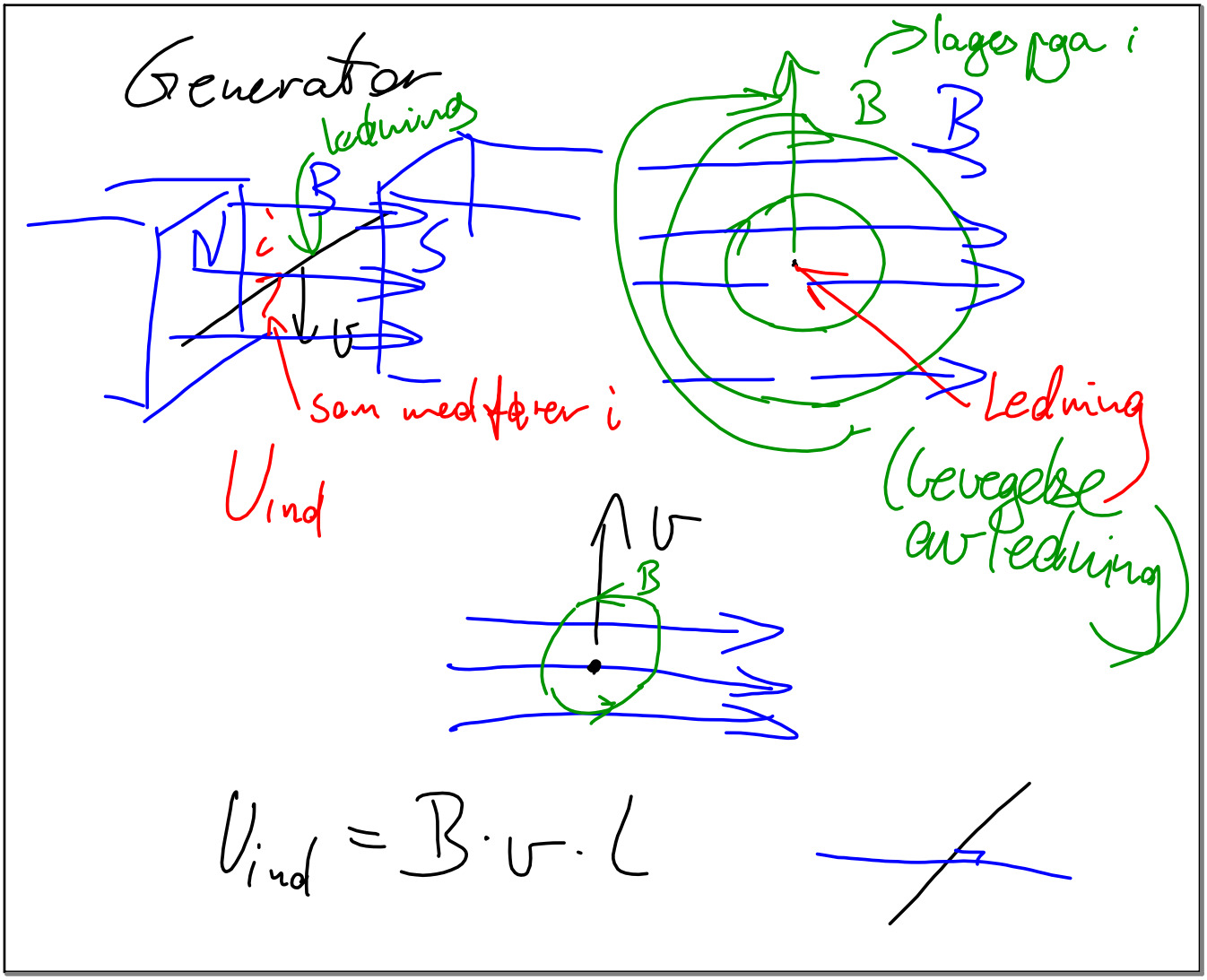
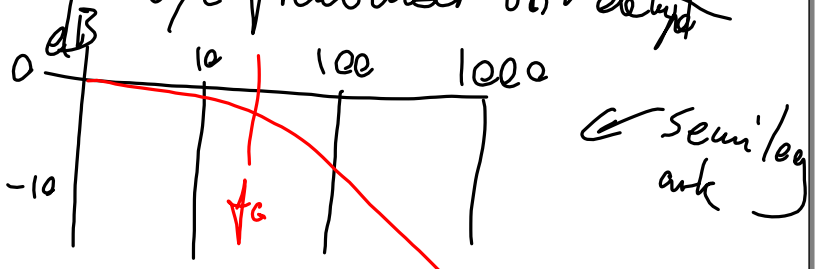
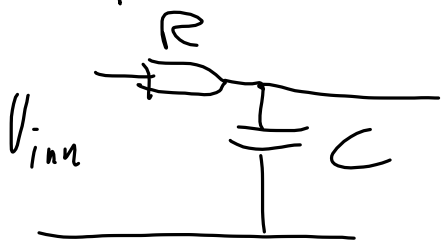

Generator
ledning
B
N
i
S
v
som medfører i
U_{ind}
lages pga i
B B
Ledning
(bevegelse av ledning)
v
B
$U_{ind} = B \cdot v \cdot l$

LP-filter → Low frekvenser slipper igjennom
Høye frekvenser blir dempet

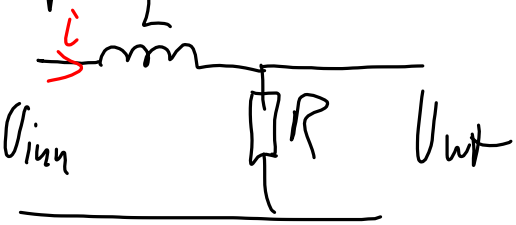


LP-filter med kondensator



$$\frac{V_{ut}}{V_{inn}} = \frac{1}{1+j2\pi fCR}$$

LP-filter med induktanse



$$Z_L = j2\pi fL$$

$$i = \frac{V_{inn}}{R+j2\pi fL} \qquad V_{ut} = i \cdot R$$

$$V_{ut} = \frac{V_{inn}}{R+j2\pi fL} R$$

$$\frac{V_{ut}}{V_{inn}} = \frac{R}{R+j2\pi fL} = \frac{1}{1+j2\pi f\frac{L}{R}}$$

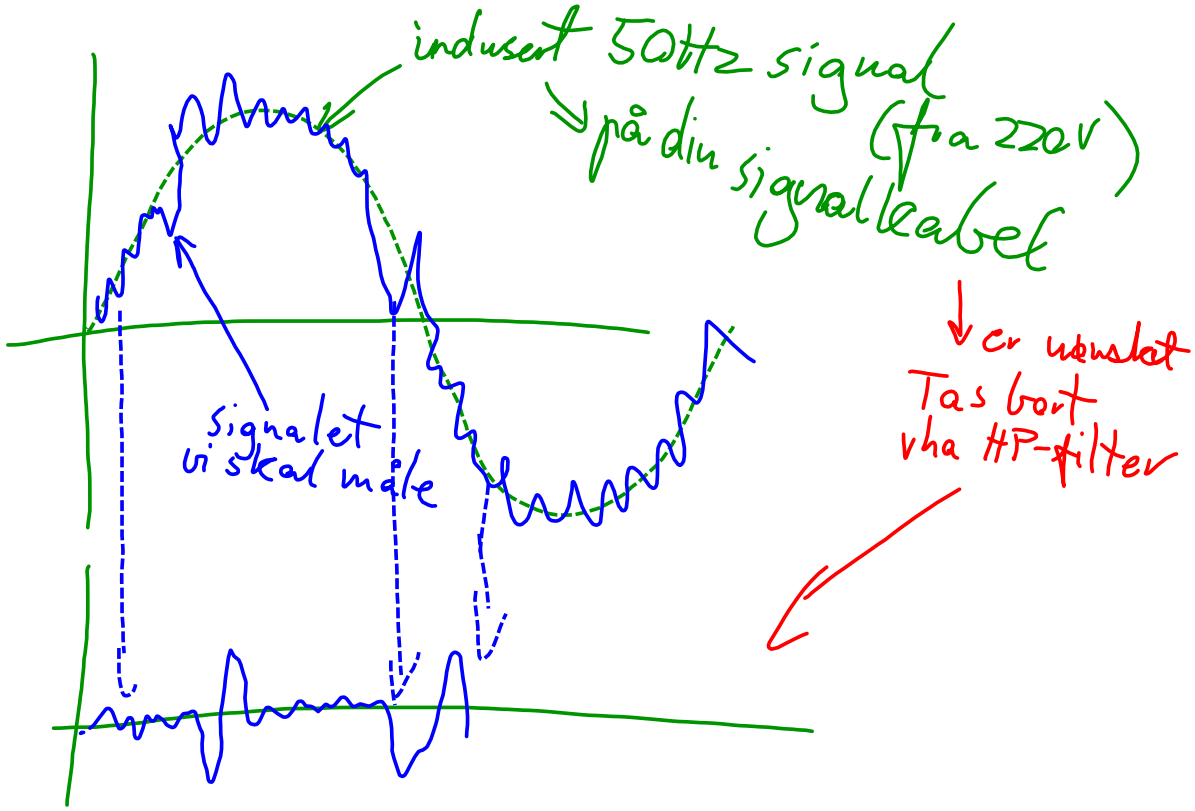
$$1 = 2\pi f_G \cdot \frac{L}{R}$$

$$f_G = \frac{1}{2\pi}\frac{R}{L} = \frac{R}{2\pi L}$$

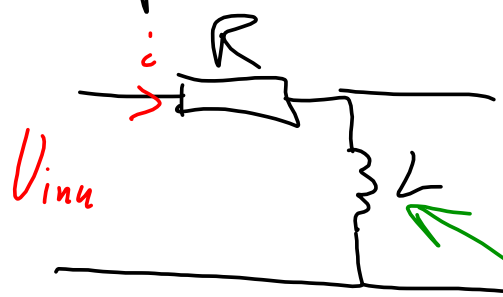
HP-filter (High Pass filter)

Bruk 1: Hvis ditt signal har en DC-komponent som vi ikke ønsker

Bruk 2



HP-filter vha spole



$$Z_L = j2\pi f L$$

$$i = \frac{V_{inn}}{R + Z_L} \qquad V_{ut} = i \cdot Z_L$$

$$V_{ut} = \frac{V_{inn}}{R + Z_L} \cdot Z_L$$

$$\frac{V_{ut}}{V_{inn}} = \frac{Z_L}{R + Z_L} = \frac{j2\pi f L}{R + j2\pi f L} = \frac{j2\pi f \frac{L}{R}}{1 + j2\pi f \frac{L}{R}}$$

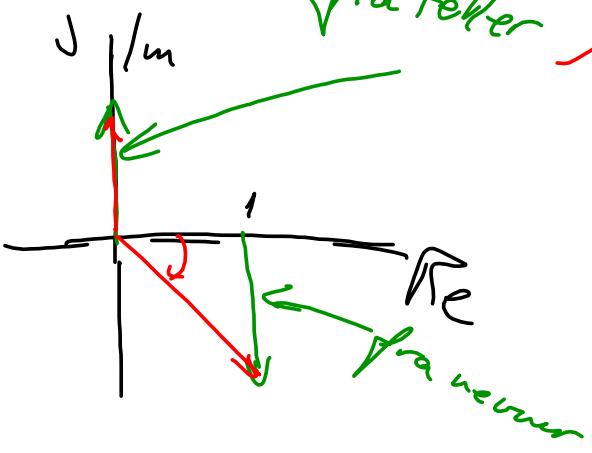
HP-filter

$$\frac{V_{ut}}{V_{inn}} = \frac{j \frac{f}{f_G}}{1 + j \frac{f}{f_G}}$$

$$1 = 2\pi f_G \cdot \frac{L}{R}$$

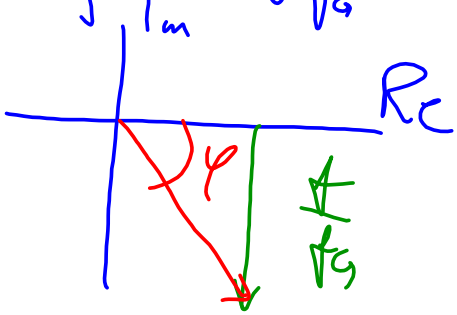
$$f_G = \frac{1}{2\pi \frac{L}{R}}$$

fra teller

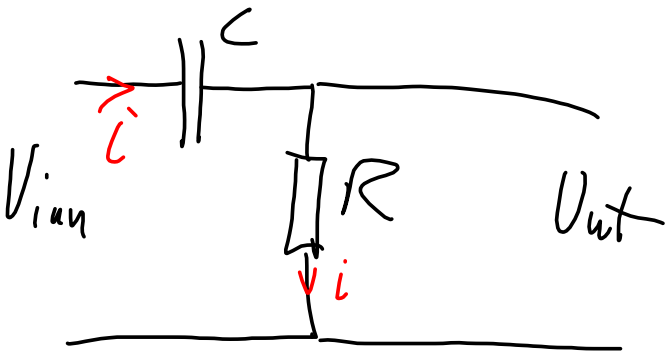


LP-filter

$$\frac{V_{ut}}{V_{inn}} = \frac{1}{1 + j \frac{f}{f_G}}$$



HP-filter vha C (kondensator)



$$i = \frac{V_{inn}}{Z_C + R} \qquad U_{ut} = i \cdot R$$

$$V_{ut} = \frac{V_{inn}}{Z_C + R} \cdot R$$

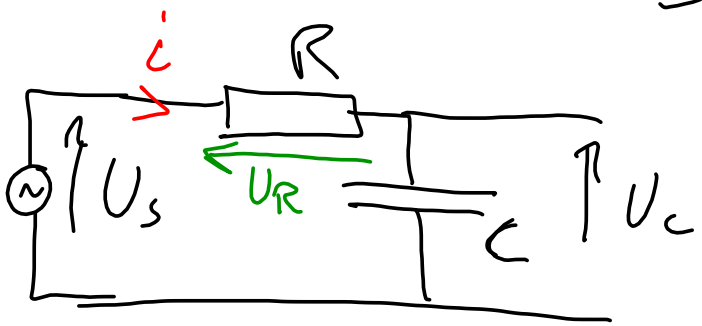
$$\frac{V_{ut}}{V_{inn}} = \frac{R}{Z_C + R} = \frac{R}{\frac{1}{j2\pi fC} + R} = \frac{j2\pi fCR}{1 + j2\pi fCR}$$

$$1 = 2\pi f_G CR$$

$$f_G = \frac{1}{2\pi CR}$$

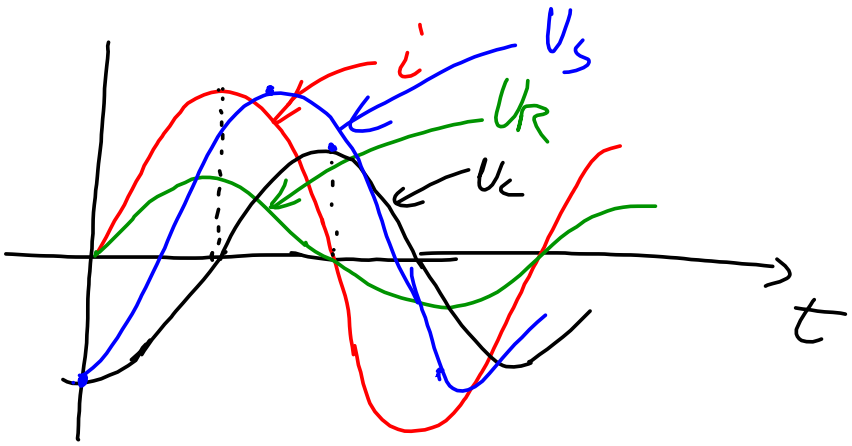
$$\frac{V_{inn}}{V_{ut}} = \frac{j\frac{f}{f_G}}{1 + j\frac{f}{f_G}}$$

Hvordan er spenninger og strøm i LP vha C

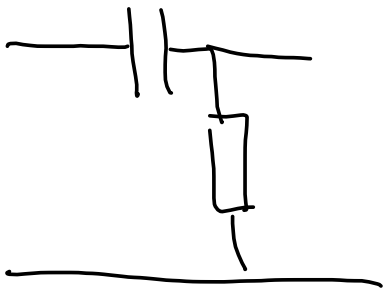


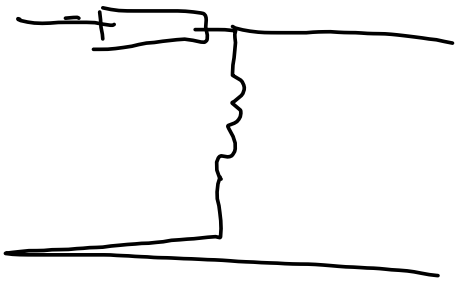
$$U_s = U_R + U_c$$

$$i = C \cdot \frac{du}{dt}$$

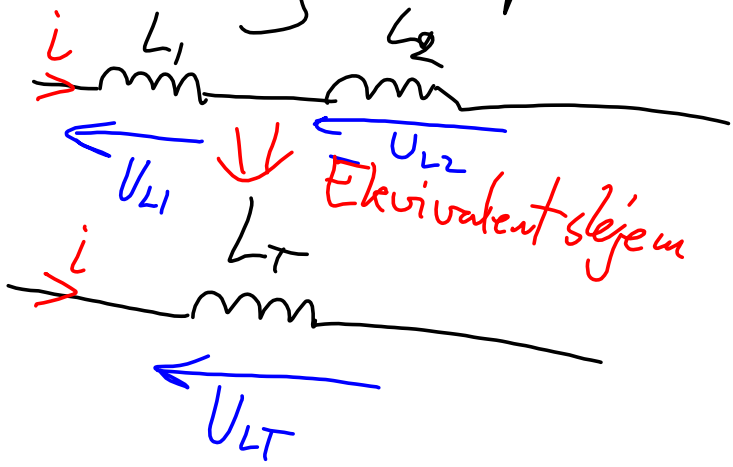


HP





Seriekobling av spoler



$$u = L \cdot \frac{di}{dt}$$

$$U_{LT} = U_{L1} + U_{L2}$$

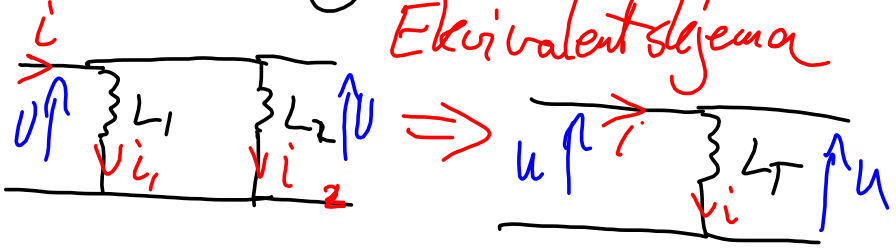
$$L_T \frac{di}{dt} = L_1 \cdot \frac{di}{dt} + L_2 \frac{di}{dt}$$

$$L_T = L_1 + L_2$$

$$U_{L1} = L_1 \frac{di}{dt}$$

$$\frac{di}{dt} = \frac{U_{L1}}{L_1}$$

Parallellkobling av spoler



$$u = L_T \frac{d(i_1 + i_2)}{dt} = L_T \left(\frac{di_1}{dt} + \frac{di_2}{dt} \right)$$

$$u = L_T \left(\frac{U}{L_1} + \frac{U}{L_2} \right)$$

$$\frac{1}{L_T} = \frac{1}{L_1} + \frac{1}{L_2}$$