

# Dæmi 1 - Einingarrampur

Spennan yfir 2F þétti er gefin sem  $v_c(t) = 10r(t) - 20r(t-1) + 10r(t-1)$  þar sem  $r(t) = tu(t)$  er einingarrampfallið. Rissið upp strauminn, aflið og geymda orku, sem fall af tíma. Merkið ása og sýnið hæstu gildi á öllum gröfum.

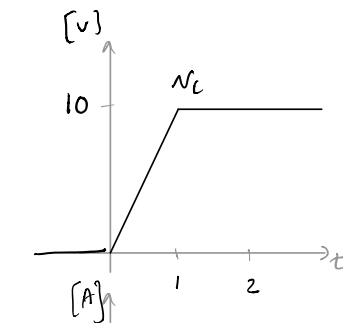
Höfn  $r(t) = t \cdot u(t)$

$r'(t) = (1) \cdot u(t) + t \cdot (\delta(t))$  en  $t \cdot \delta(t) = 0 \quad \forall t$  svo  $r'(t) = u(t)$

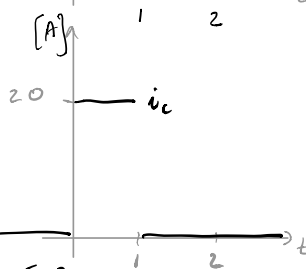
Nú  $v_c(t) = 10r(t) - 20r(t-1) + 10r(t-1) = 10(r(t) - r(t-1)) = \begin{cases} 0 & t < 0 \\ 10t & 0 \leq t < 1 \\ 10 & \text{annars} \end{cases}$

Höfn  $i_c(t) = C \frac{dv_c}{dt} = C \frac{d}{dt} (10[r(t) - r(t-1)])$   
 $= 10C [r'(t) - r'(t-1)] = 10C [u(t) - u(t-1)]$

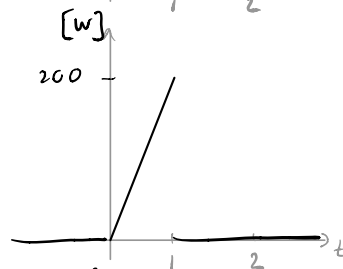
Nú  $C = 2F$  svo  $i_c(t) = 20[u(t) - u(t-1)] = \begin{cases} 20 & 0 \leq t < 1 \\ 0 & \text{annars} \end{cases}$



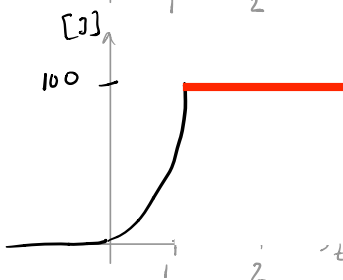
$$v_c(t) = 10(r(t) - r(t-1)) \text{ V}$$



$$i_c(t) = 20[u(t) - u(t-1)] \text{ A}$$



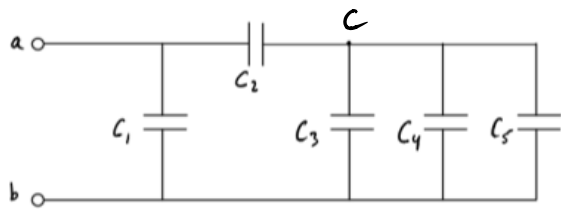
$$p_c = i_c \cdot v_c = 200t(u(t) - u(t-1)) \text{ W}$$



$$w_c = \frac{1}{2} C v_c^2 = w_c^2 = 100t^2(r(t) - r(t-1)) \text{ J}$$

## Dæmi 2 – Jafngildisrýmd og -span

Finnið jafngildisrýmd  $C_{eq}$  milli póla a og b.

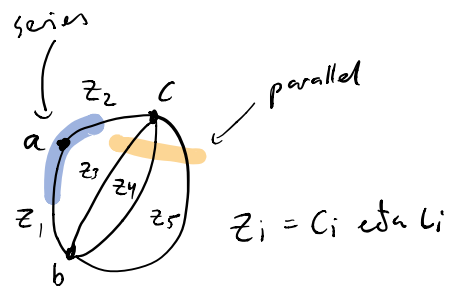


Breyta	Gildi
$C_1, C_2, C_4$	2F
$C_3$	3F
$C_5$	4F

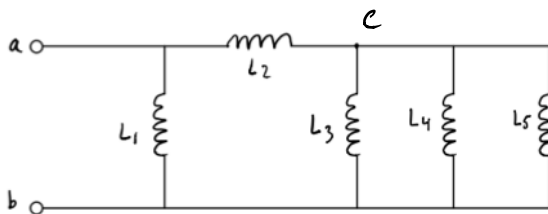
Hef  $C_1 \parallel C_2 = C_1 + C_2$   $\&$   $C_1 \perp C_2 = \frac{C_1 C_2}{C_1 + C_2}$

$\underbrace{\hspace{100px}}$  hlíðtenging
 $\underbrace{\hspace{100px}}$  rúðtenging

$$C_{eq} = C_1 \parallel \left( C_2 \perp (C_3 \parallel C_4 \parallel C_5) \right) = \underline{\underline{\frac{40}{11} \text{ F}}}$$



Finnið nú jafngildisspan  $L_{eq}$  milli póla a og b.



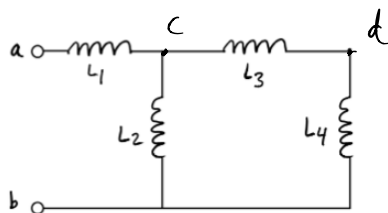
Breyta	Gildi
$L_1, L_2, L_4$	2H
$L_3$	3H
$L_5$	4H

Hef  $L_1 \parallel L_2 = \frac{L_1 L_2}{L_1 + L_2}$   $\&$   $L_1 \perp L_2 = L_1 + L_2$

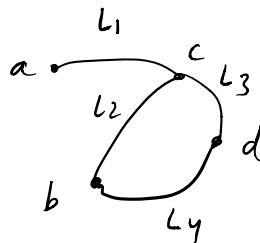
$$L_{eq} = L_1 \parallel \left( L_2 \perp (L_3 \parallel L_4 \parallel L_5) \right) = \underline{\underline{\frac{19}{16} \text{ H}}}$$

## Dæmi 3 – Jafngildisspan

Finnið jafngildisspan  $L_{eq}$  milli póla a og b.



Breyta	Gildi
$L_1$	3H
$L_2$	6H
$L_3$	4H
$L_4$	5H



Hef  $\&$   $L_{eq} = L_1 \perp (L_2 \parallel (L_3 \perp L_4)) = \frac{33}{5} \text{ H}$