2023-10-04

Charge de cours

Exercice 2 Devoir 1

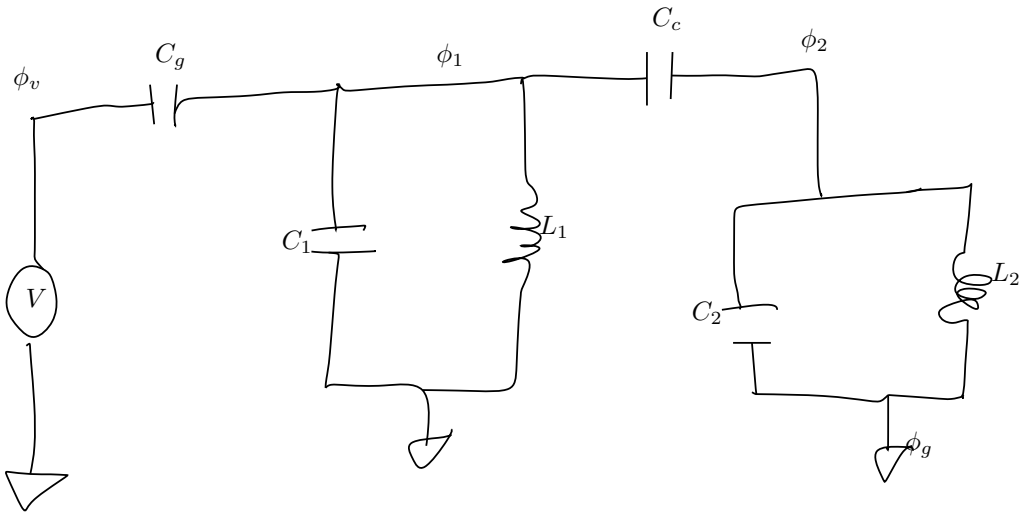

Figure 1: figure

1. Identification des flux:

$$\phi_1, \phi_2, \phi_v, \phi_g$$

2. flux ??nomique ϕ_1, ϕ_2
3. Arbre Générateur (2 branches)
4. L

   Methode 2

$$\tilde{C} \quad 4\text{x}4$$

$$\tilde{C} = \begin{pmatrix} C_1 + C_c + C_g & -C_C & -C_g & -C_1 \\ -C_c & C_2 + C_C & 0 & -C_2 \\ -C_g & 0 & C_g & 0 \\ -C_1 & -C_2 & 0 & C_1 + C_2 \end{pmatrix}$$

$$L^{-1} = \cdots$$

On passe en 3x3

$$\mathscr{L} = \frac{1}{2}\dot{\phi}^T C\dot{\phi} - \frac{1}{2}\phi^T L^{-1}\phi$$

5. Hamiltonien

$$\cdots$$

$$H = \omega_1 a_1^\dagger a_1 + \omega_2 a_2^\dagger a_2 - i\mathcal{E}\left(a_1^\dagger - a\right) - i\mathcal{E}_2\left(a_2^\dagger a_2\right) - g(a_1 a_2^\dagger a_1^\dagger a_2) + g\left(a_1^\dagger a_2^\dagger + a_1 a_{@}\right)$$

$$U(t) = \exp\Big(i\omega_1 a_1^\dagger a_1 + i\omega_2 a_2^\dagger a_2\Big)$$

$$H' = UHU^\dagger + i\dot{U}U^\dagger$$

$$\begin{aligned} Ua_1U^\dagger &= a_1 e^{-i\omega_1 t} \\ Ua_2U^\dagger &= a_2 e^{-i\omega_1 t} \\ Ua_1^\dagger U^\dagger &= a_1 e^{i\omega_1 t} \\ Ua_2^\dagger U^\dagger &= a_2^\dagger e^{i\omega_1 t} \end{aligned}$$

$$Ua_1^\dagger a_1 U^\dagger = \Big(UA_1^\dagger U\Big)\left(U^\dagger a_1 U\right) = a_1^\dagger e^+ a_1 e^- = a_1^\dagger a_1$$

$$H' = \cancel{\omega_1 a_1^\dagger a_1} + \cancel{\omega_2 a_2^\dagger a_2} - i\mathcal{E}\left(a_1^\dagger e^+ + \text{H.C.}\right) - i\mathcal{E}_2\left(a_2^\dagger e^+ - \text{H.C.}\right) - g(a_1 a_2^\dagger e^{\omega_2-\omega_1} + \text{H.C.}) + g\left(a_1^\dagger a_2^\dagger e^{\omega_1+\omega_2} + \text{H.C.}\right)$$

Exercice 2