

Suprimo  $V_4$

$$Y_{MAI} = \begin{pmatrix} \frac{1}{sL} & 0 & 0 \\ 0 & \frac{1}{sL} & 0 \\ 0 & 0 & sC \\ -\frac{1}{sL} & -\frac{1}{sL} & -sC \end{pmatrix} \begin{pmatrix} -\frac{1}{sL} \\ -\frac{1}{sL} \\ -sC \\ \frac{2}{sL} + sC \end{pmatrix} \begin{pmatrix} V_1 \\ V_2 \\ V_3 \\ V_4 \end{pmatrix}$$

$$Y_{MAI}' = Y_{11} - Y_{12} Y_{22}^{-1} Y_{21}$$

$$Y_{MAI}' = \begin{bmatrix} \frac{1}{sL} & 0 & 0 \\ 0 & \frac{1}{sL} & 0 \\ 0 & 0 & sC \end{bmatrix} - \begin{bmatrix} -\frac{1}{sL} \\ -\frac{1}{sL} \\ -sC \end{bmatrix} \begin{bmatrix} -\frac{1}{sL} & -\frac{1}{sL} & -sC \\ \frac{2}{sL} + sC \end{bmatrix}$$

$$\frac{1}{\frac{2}{sL} + sC} \begin{bmatrix} -\frac{1}{sL} & -\frac{1}{sL} & -sC \end{bmatrix}$$

$$\begin{bmatrix} -\frac{1}{sL} & \frac{1}{\frac{2}{sL} + sC} & -\frac{1}{sL} & \frac{1}{\frac{2}{sL} + sC} & \frac{-sC}{\frac{2}{sL} + sC} \end{bmatrix}$$

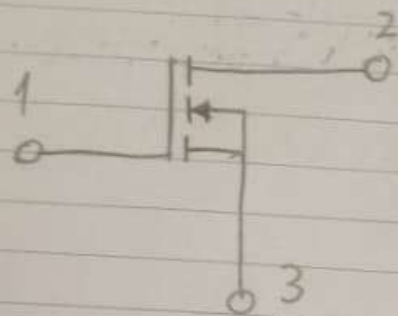
$$\begin{bmatrix} -\frac{1}{sL} \\ -\frac{1}{sL} \\ -sC \end{bmatrix} \begin{bmatrix} -\frac{1}{sL} & \frac{1}{\frac{2}{sL} + sC} & -\frac{1}{sL} & \frac{1}{\frac{2}{sL} + sC} & \frac{-sC}{\frac{2}{sL} + sC} \end{bmatrix}$$

$$\begin{bmatrix} \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \frac{\frac{C}{L}}{\frac{2}{sL} + sC} \\ \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \frac{\frac{C}{L}}{\frac{2}{sL} + sC} \\ \frac{C}{L} \frac{1}{\frac{2}{sL} + sC} & \frac{C}{L} \frac{1}{\frac{2}{sL} + sC} & \frac{\frac{2}{sL} + sC}{s^2 C^2} \end{bmatrix}$$

12)

$$Y_{NAI}^1 = \begin{bmatrix} \frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & -\left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \frac{-\frac{C}{L}}{\frac{2}{sL} + sC} \\ -\left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & \frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC} & -\frac{C}{L} \\ -\frac{C}{L} \frac{1}{\frac{2}{sL} + sC} & -\frac{C}{L} \frac{1}{\frac{2}{sL} + sC} & sC - \frac{s^2 C^2}{\frac{2}{sL} + sC} \end{bmatrix}$$

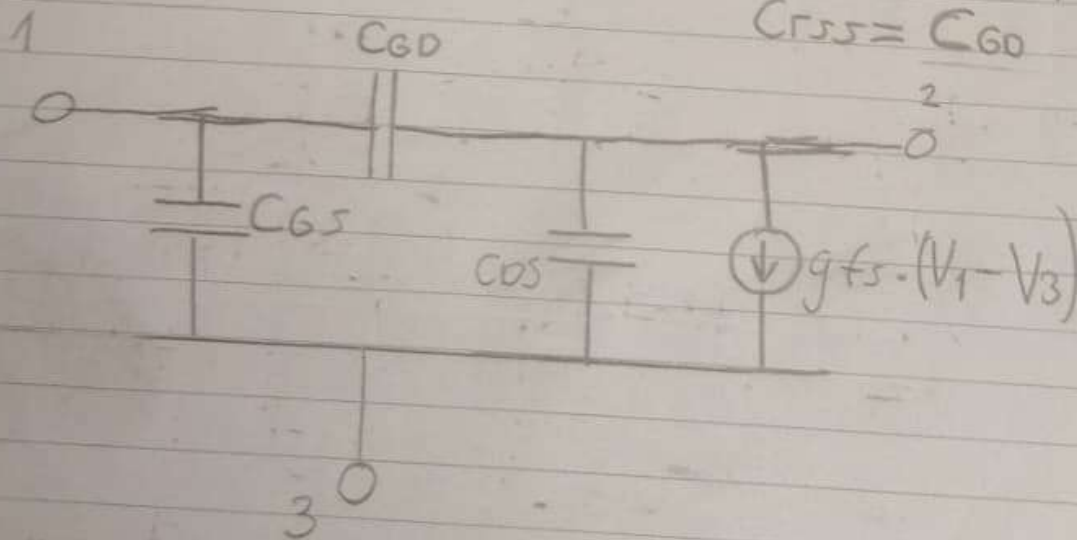
1b)



$$C_{iss} = C_{GD} + C_{GS}$$

$$C_{oss} = C_{DS} + C_{GD}$$

$$C_{rss} = C_{GD}$$



G  
1D  
2S  
3

$$Y_{NAI} = \begin{pmatrix} s(C_{GS} + C_{GD}) & -sC_{GD} & -sC_{GS} \\ -sC_{GD} + gfs & s(C_{GD} + C_{DS}) & -gfs - sC_{DS} \\ -gfs + s(C_{GS}) & -sC_{DS} & gfs + s(C_{GS} + C_{DS}) \end{pmatrix}$$

$$Y_{NAI} = \begin{pmatrix} s(C_{ISS}) & -sC_{ISS} & -s(C_{ISS} - C_{RSS}) \\ gfs - sC_{RSS} & sC_{OSS} & -gfs - s(C_{OSS} - C_{RSS}) \\ -gfs - s(C_{ISS} - C_{RSS}) & -s(C_{OSS} - C_{RSS}) & +gfs + s(2C_{RSS} - C_{ISS} - C_{OSS}) \end{pmatrix}$$

$$gfs + s(2C_{RSS} - C_{ISS} - C_{OSS})$$

$$2) a) \frac{V_{23}}{V_{13}} = \frac{s g(2-3) s g(1-3)}{1} \cdot \frac{V_{13}}{V_{13}}$$

$$\frac{V_{13}}{V_{13}} = (-1)^{1+3+2+3} \left[ -\left(\frac{1}{sL}\right) \frac{1}{\frac{2}{sL} + sC} \right]$$

$$\frac{V_{13}}{V_{13}} = (-1)^{1+3+1+3} \left[ \frac{1}{sL} - \left(\frac{1}{sL}\right) \frac{2}{\frac{2}{sL} + sC} \right]$$



$$\frac{V_{23}}{V_{13}} = \frac{1 + \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC}}{\frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC}}$$

$$\frac{V_{23}}{V_{13}} = \frac{\left(\frac{1}{sL}\right)^2}{\frac{1}{sL} \left(\frac{2}{sL} + sC\right) - \left(\frac{1}{sL}\right)^2} = \frac{1}{sL \left(\frac{2}{sL} + sC\right) - 1}$$

$$\boxed{\frac{V_{23}}{V_{13}} = \frac{1}{s^2 + 1/LC}}$$

$$\frac{V_{21}}{V_{31}} = \frac{5g(2-1)5g(3-1)}{+} \frac{Y_{21}^{31}}{Y_{31}^{31}}$$

$$\frac{V_{21}}{V_{31}} = \frac{(-1)^{2+1+3+1}}{(-1)^{31}} \left[ \frac{-\frac{C}{L}}{\frac{2}{sL} + sC} \right] = \frac{\frac{C}{L}}{\frac{2}{sL} + sC}$$

$$\frac{V_{21}}{V_{31}} = \frac{(-1)^{3+1+3+1}}{(+1)} \left[ \frac{\frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC}}{+} \right]$$

$$\frac{V_{21}}{V_{31}} = \frac{\frac{C}{L} \frac{1}{\frac{2}{sL} + sC}}{\frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC}} = \frac{\frac{C}{L}}{\frac{1}{sL} \left(\frac{2}{sL} + sC\right) - \left(\frac{1}{sL}\right)^2}$$

$$\frac{V_{21}}{V_{31}} = \frac{\frac{C}{L} \cdot 3L^2}{sL \left( \frac{2}{sL} + sC \right) - 1}$$

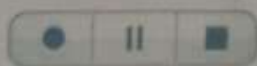
$$\frac{V_{21}}{V_{31}} = \frac{s^2 CL}{s^2 CL + 1}$$

$$\frac{V_{21}}{V_{31}} = \frac{s^2}{s^2 + \frac{1}{LC}}$$

$$\frac{V_{12}}{V_{32}} = \frac{s g(1-2) s g(3-2)}{(-)} \quad \begin{matrix} 32 \\ 12 \end{matrix}$$

$$\frac{V_{12}}{V_{32}} = \frac{(-1)^{3+2+1+2}}{(+)} \left[ \frac{-\frac{C}{L}}{\frac{2}{sL} + sC} \right]$$

$$\frac{V_{12}}{V_{32}} = \frac{(-1)^{3+2+3+2}}{(+)} \left[ \frac{1}{sL} - \left( \frac{1}{sL} \right)^2 \frac{1}{\frac{2}{sL} + sC} \right]$$



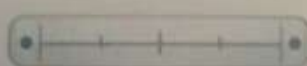
record pause stop



jump



bookmark



0% jump to position 100%



playback speed



$$\frac{V_{12}}{V_{32}} = \frac{\frac{C}{L} \frac{1}{\frac{2}{sL} + sC}}{\frac{\frac{1}{sL} - \left(\frac{1}{sL}\right)^2 \frac{1}{\frac{2}{sL} + sC}} = \frac{s^2}{s^2 + \frac{1}{LC}}$$

3) a)

$$Y_{SC} = \begin{pmatrix} s(C_{1SS}) & -sC_{rSS} \\ gfs - sC_{1SS} & sC_{oSS} \end{pmatrix}$$

$$Y_{DC} = \begin{pmatrix} sC_{1SS} & -s(C_{1SS} - C_{rSS}) \\ -gfs - s(C_{1SS} - C_{rSS}) & gfs - (2C_{rSS} - C_{1SS} - C_{oSS}) \end{pmatrix}$$

b)

$$T_{ABCD} = \begin{pmatrix} \frac{sC_{oSS}}{gfs - sC_{1SS}} & \frac{1}{gfs - sC_{1SS}} \\ \frac{-2\Delta Y_{SC}}{gfs - sC_{1SS}} & \frac{sC_{1SS}}{gfs - sC_{1SS}} \end{pmatrix}$$

$$\Delta Y_{SC} = s^2 C_{1SS} C_{oSS} + (gfs - sC_{1SS}) s C_{rSS}$$