\[ V_s = (Z_s + R + j\omega L_1) I_1 - j\omega M I_2 = Z_{11} I_1 - j\omega M I_2 \]

\[ 0 = -j\omega M I_1 + (R_2 + j\omega L_2 + Z_L) I_2 = -j\omega M I_1 + Z_{22} I_2 \]

\[ I_1 = \frac{\begin{vmatrix} V_s & -j\omega M \\ 0 & Z_{22} \end{vmatrix}}{\begin{vmatrix} Z_{11} & -j\omega M \\ -j\omega M & Z_{22} \end{vmatrix}} = \frac{Z_{22} V_s}{Z_{11} Z_{22} + (\omega M)^2} \]

\[ I_2 = \frac{\begin{vmatrix} Z_{11} & V_s \\ -j\omega M & 0 \end{vmatrix}}{\begin{vmatrix} Z_{11} & -j\omega M \\ -j\omega M & Z_{22} \end{vmatrix}} = \frac{j\omega M V_s}{Z_{11} Z_{22} + (\omega M)^2} = \frac{j\omega M}{Z_{22}} I_1 \]