Train simple ⋆

A3-05

C2-06

Question 1 Tracer le graphe des liaisons.

Question 2 Déterminer ω_{40} en fonction de ω_{30} et ω_{10}.

En bloquant le porte satellite, on a : $\frac{\omega_{43}}{\omega_{13}} = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}$. On a donc, $\frac{\omega_{40}+\omega_{03}}{\omega_{10}+\omega_{03}} = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}$
$\Leftrightarrow \omega_{40} + \omega_{03} = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}(\omega_{10}+\omega_{03}) \Leftrightarrow \omega_{40} = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}(\omega_{10}+\omega_{03}) - \omega_{03} \Leftrightarrow \omega_{40} =$
$-\frac{Z_1 Z_{22}}{Z_{21} Z_4}(\omega_{10}+\omega_{03}) + \omega_{30} \Leftrightarrow \omega_{40} = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}\omega_{10} + \omega_{30}\left(1 + \frac{Z_1 Z_{22}}{Z_{21} Z_4}\right)$.

Question 3 On suppose que ω_{40} est bloqué. Exprimer le rapport $\frac{\omega_{30}}{\omega_{10}}$.

$$0 = -\frac{Z_1 Z_{22}}{Z_{21} Z_4}\omega_{10} + \omega_{30}\left(1 + \frac{Z_1 Z_{22}}{Z_{21} Z_4}\right)$$

$$\Leftrightarrow \frac{Z_1 Z_{22}}{Z_{21} Z_4}\omega_{10} = \omega_{30}\left(1 + \frac{Z_1 Z_{22}}{Z_{21} Z_4}\right)$$

$$\Leftrightarrow \frac{\omega_{30}}{\omega_{10}} = \frac{\frac{Z_1 Z_{22}}{Z_{21} Z_4}}{1 + \frac{Z_1 Z_{22}}{Z_{21} Z_4}} = \frac{Z_1 Z_{22}}{Z_{21} Z_4 + Z_1 Z_{22}}.$$