



Critical → page 28, 32, 36

Compatibility conditions

$$\omega_1 = 62.5 \text{ rad/s}$$

$$\omega_2 = 263 \text{ rad/s}$$

① At junction pt, the deflection @ each branch is identical

$$\theta_{1e} = \theta_{2e} = \theta_{3e} = \dots = \theta_{(n-1)e}$$

② The torque summation of the 1<sup>st</sup> (n-1) branches @ the junction pt should be equal to the starting torque @ the last branch.

$$T_{1e} + T_{2e} + T_{3e} + \dots + T_{(n-1)e} = T_{n1}$$

③ For the last branch the starting pt of the col is the junction, ∴

$$\theta_{n1} = \theta_{(n-1)e}$$

$$= \frac{\omega^2}{K_3} \left( 5.6 + 18 + 30.6 \left( \theta_{31} - \frac{\omega^2}{K_3} \theta_{31} I_3 \right) \right)$$

$$= \frac{\omega^2}{K_3} \left( 23.6 + 30.6 \left( \theta_{31} - \frac{\omega^2}{K_3} \theta_{31} I_3 \right) \right)$$