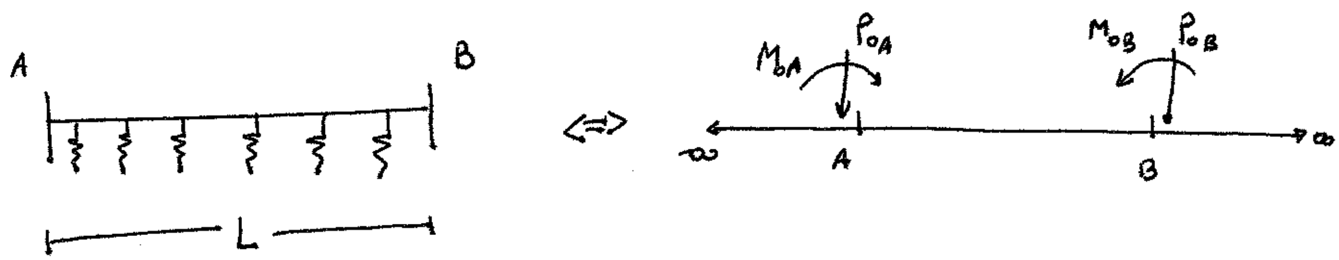
Vigas flexibles de largo finito

Método de solución



$\Rightarrow$ Se debe encontrar P_A, P_B, M_A, M_B derivado del sistema de carga real considerando la viga como infinita.

Tenemos 2 condiciones de borde para cada extremo de la viga

Viga finita con extremos libres

$$M_A + \frac{P_{oA}}{4\lambda} + \frac{M_{oA}}{2} + \frac{P_{oB}}{4\lambda} C_{\lambda L} + \frac{M_{oB}}{2} D_{\lambda L} = 0$$

$$V_A - \frac{P_{oA}}{2} - \frac{M_{oA} \cdot \lambda}{2} + \frac{P_{oB}}{2} D_{\lambda L} + \frac{M_{oB} \cdot \lambda \cdot A_{\lambda L}}{2} = 0$$

$$M_B + \frac{P_{oA}}{4\lambda} C_{\lambda L} + \frac{P_{oB}}{4\lambda} + \frac{M_{oA}}{2} D_{\lambda L} + \frac{M_{oB}}{2} = 0$$

$$V_B - \frac{P_{oA}}{2} D_{\lambda L} - \frac{\lambda M_{oA}}{2} A_{\lambda L} + \frac{P_{oB}}{2} + \frac{\lambda M_{oB}}{2} = 0$$

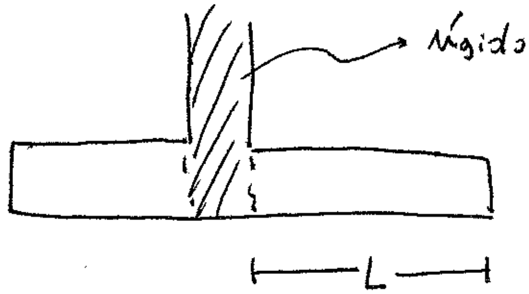
$\Rightarrow$

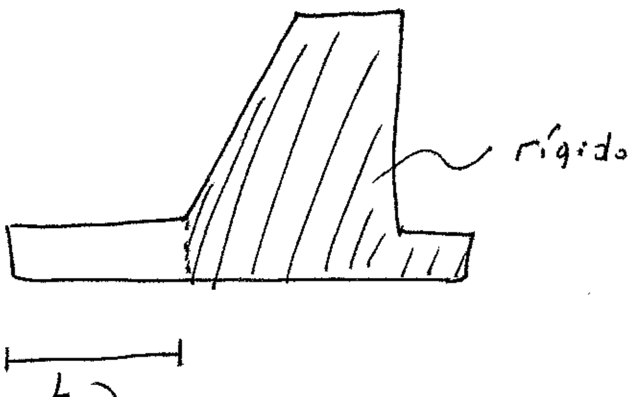
$$\begin{bmatrix} 1/2 & D_{\lambda L} & -\lambda/2 & \frac{\lambda A_{\lambda L}}{2} \\ -\frac{D_{\lambda L}}{2} & 1/2 & -\lambda/2\, A_{\lambda L} & \lambda/2 \\ \frac{1}{4\lambda} & \frac{C_{\lambda L}}{4\lambda} & 1/2 & \frac{D_{\lambda L}}{2} \\ \frac{C_{\lambda L}}{4\lambda} & \frac{1}{4\lambda} & \frac{D_{\lambda L}}{2} & 1/2 \end{bmatrix} \begin{bmatrix} P_{0A} \\ P_{0B} \\ M_{0A} \\ M_{0B} \end{bmatrix} = \begin{bmatrix} -V_A \\ -V_B \\ -M_A \\ -M_B \end{bmatrix}$$

$\Rightarrow$ obtenemos P_{0A}, P_{0B}, M_{0A}, M_{0B}

Criterios para vigas flexibles o rígidas

- $\lambda L < \pi/4$ → viga rígida





verificar $\lambda L < \pi/4$

- $\pi/4 < \lambda L < \pi$ → viga intermedia

  → cálculo debe ser hecho para viga de largo finito

- $\lambda L > \pi$ → viga infinita o semi-infinita.