Viga Conjugada

Clase 12

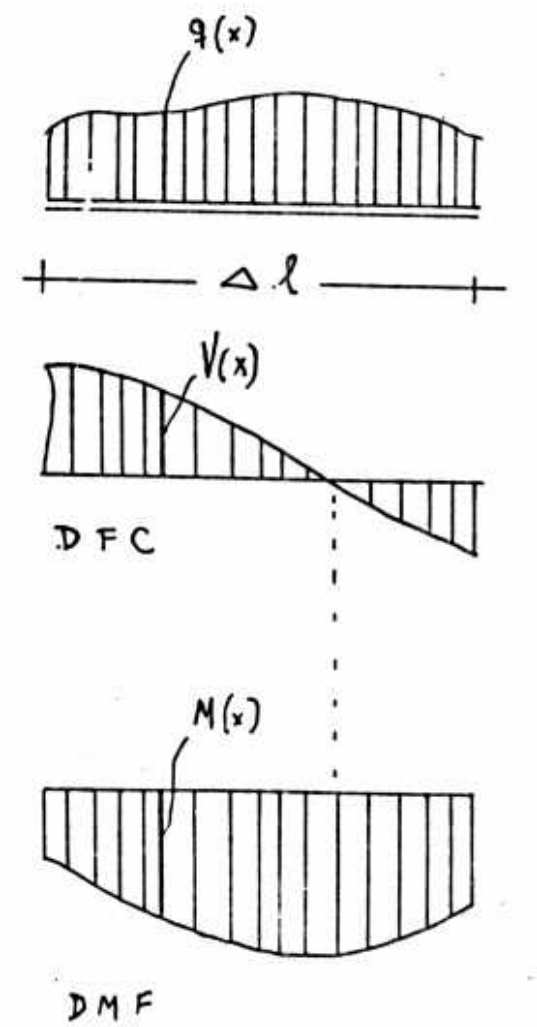
Método de la viga conjugada, Ejercicios, Influencia de la Temperatura, Cálculo por rigidez elástica

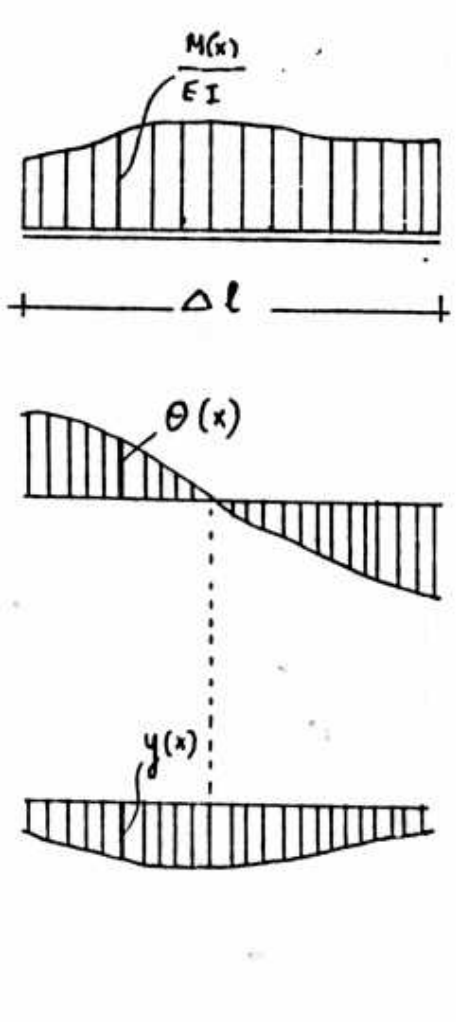
Viga Conjugada – Analogías de Mohr

$$\frac{dV}{dx} = q$$

$$\frac{dM}{dx} = V$$

$$\frac{d^2M}{dx^2} = \frac{dV}{dx} = q$$



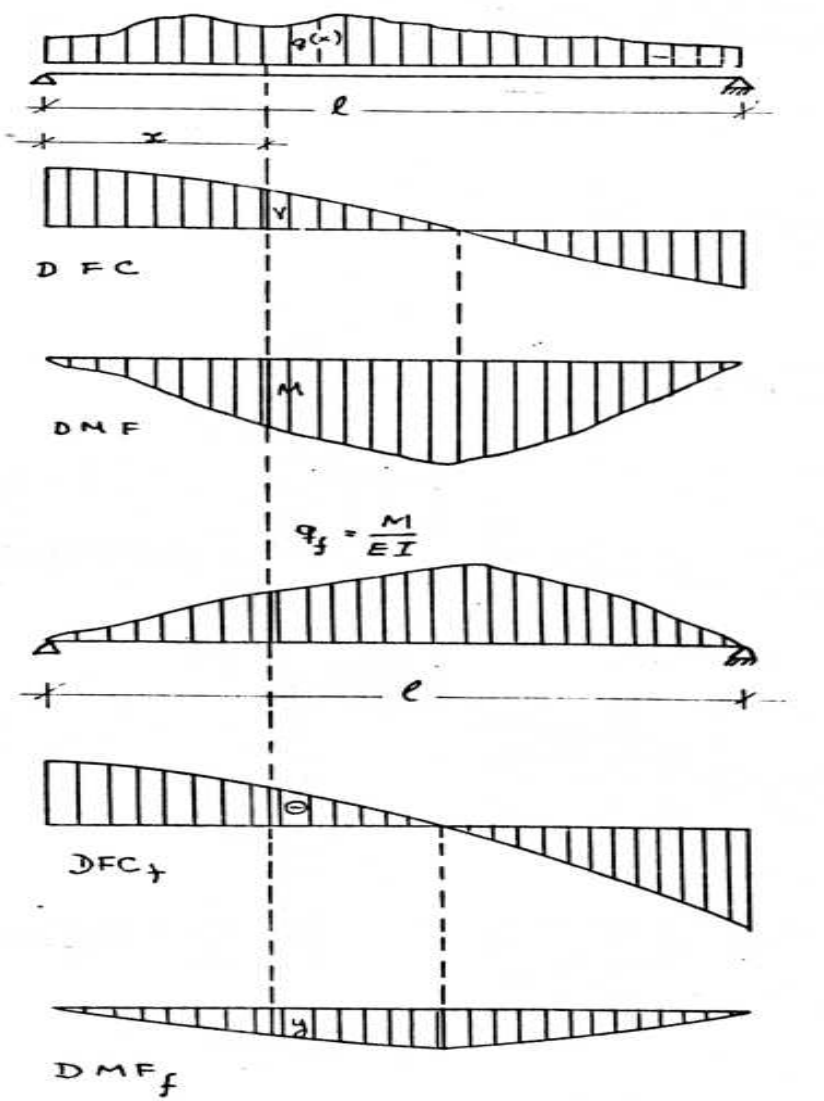


$$\frac{d\theta}{dx} = \frac{M}{EI}$$

$$\frac{dy}{dx} = \theta$$

$$\frac{d^2y}{dx^2} = \frac{d\theta}{dx} = \frac{M}{EI}$$

Viga Conjugada – Condiciones de Contorno

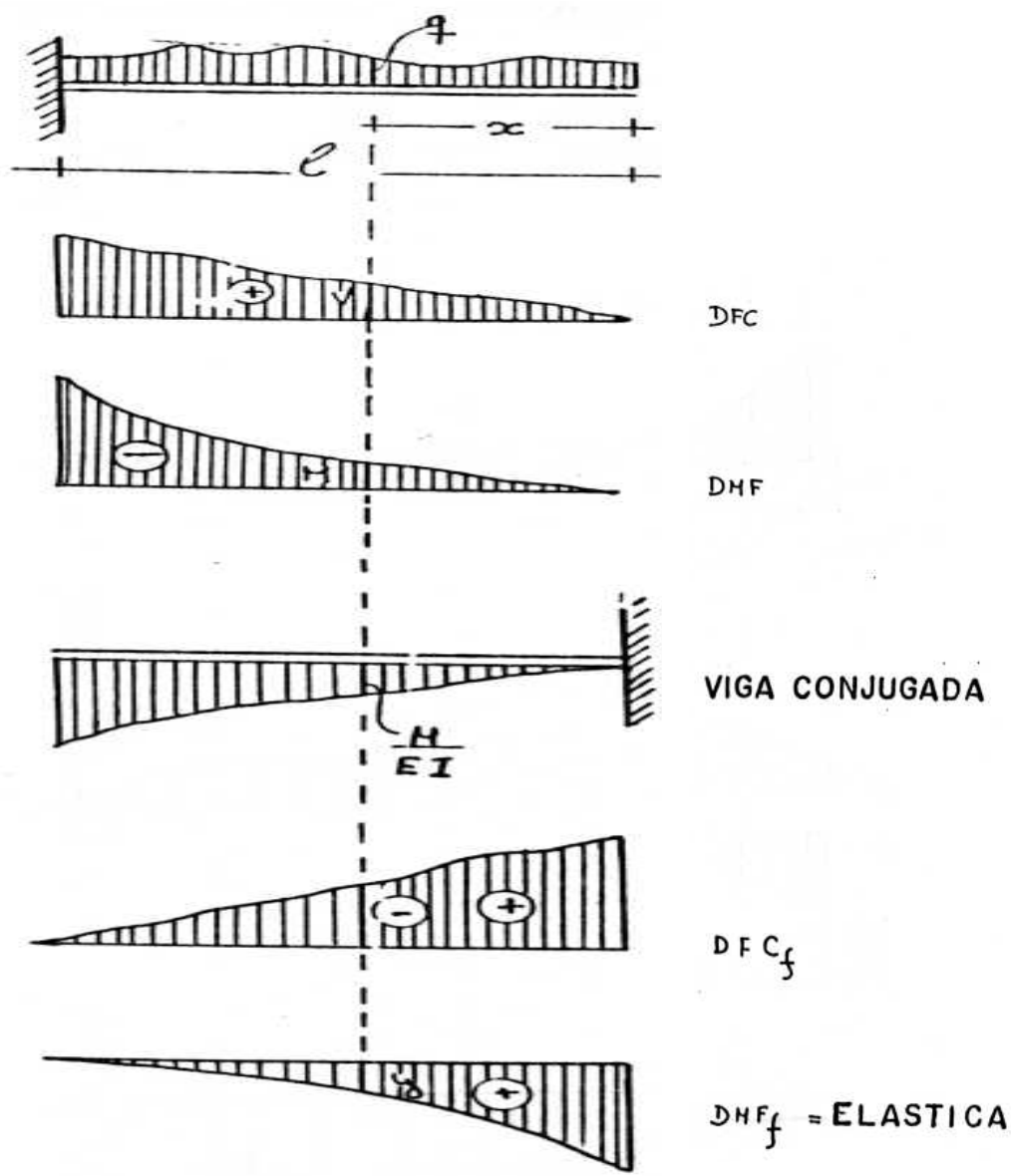


CASO: VIGA BI-APOYADA

Viga Conjugada

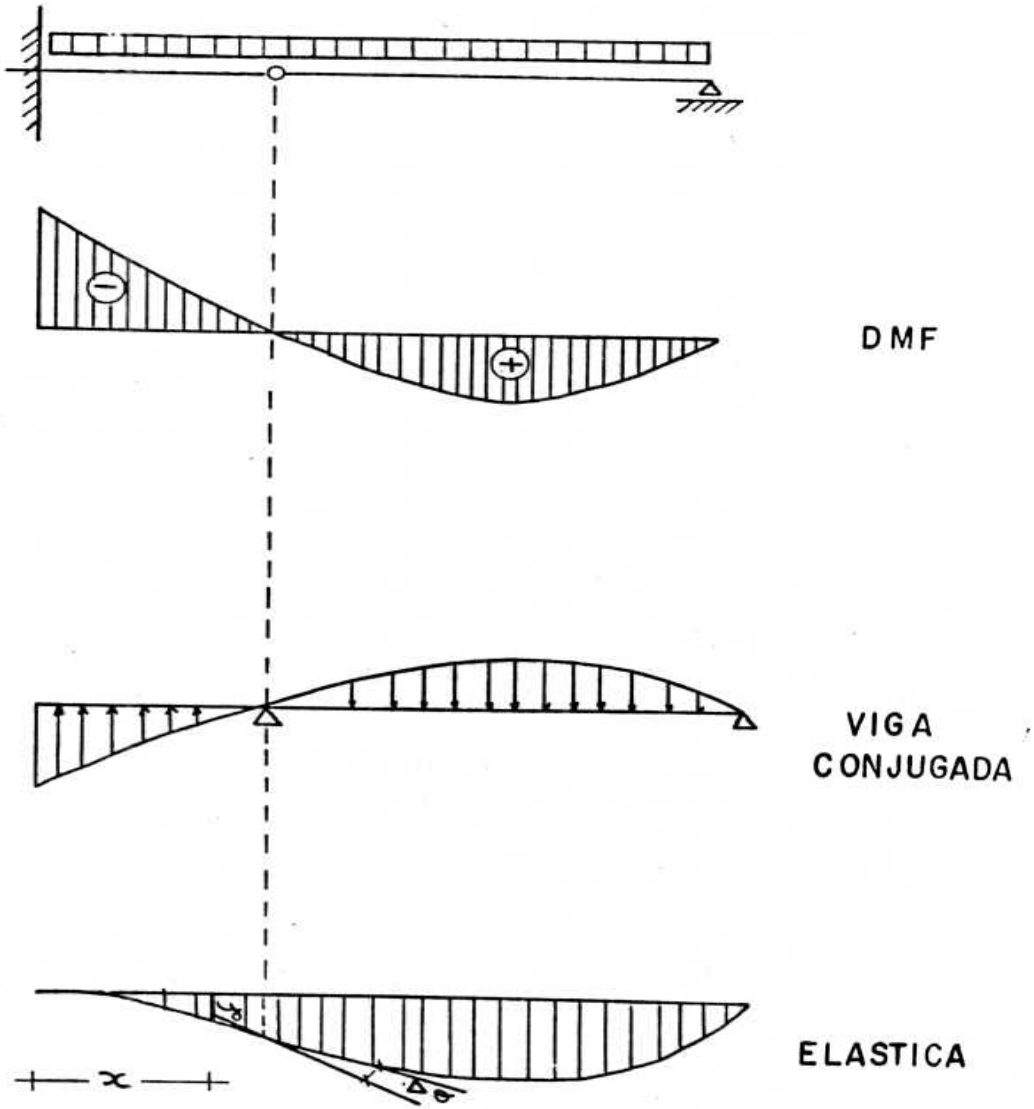
Elástica

Viga Conjugada – Condiciones de Contorno



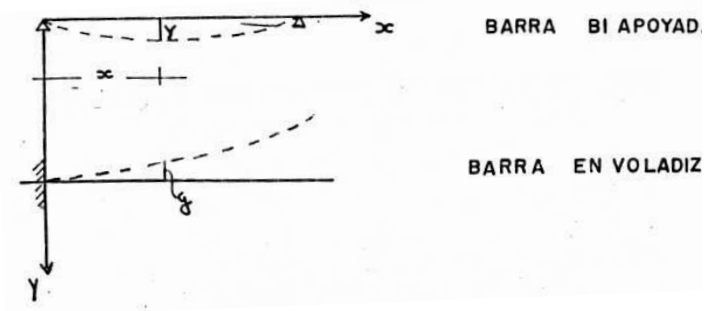
CASO: VIGA EN VOLADIZO

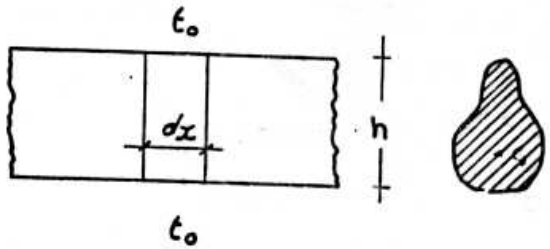
Viga Conjugada – Condiciones de Contorno



CASO: Influencia de las articulaciones

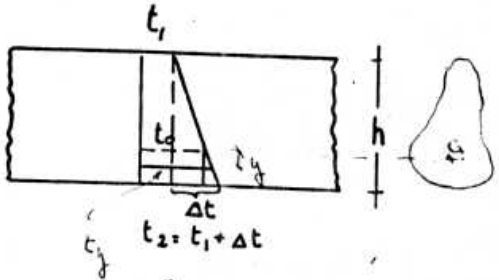
Influencia de la Temperatura





$$\varepsilon_y = \frac{y}{\rho}$$

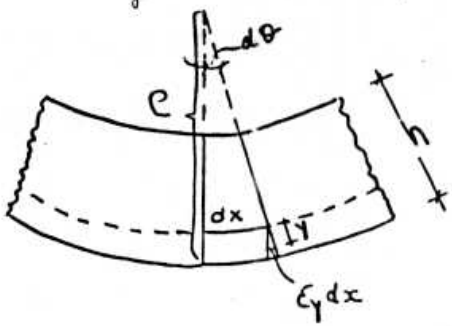
$$\varepsilon_t = \alpha (t_y - t_o)$$



$$\frac{t_y - t_o}{\Delta t} = \frac{y}{h} \qquad t_y - t_o = \frac{\Delta t}{h} y$$

$$\frac{y}{\rho} = \alpha \frac{\Delta t}{h} y$$

$$\frac{\alpha \Delta t}{h} = \frac{1}{\rho} = \frac{d\theta}{dx}$$



UN MOMENTO FLEXTOR MT PROVOCARIA LA MISMA DEFORMACION

$$d\theta = \frac{M_T}{EI} dx = \frac{\alpha \Delta t}{h} dx \quad ; \quad M_T = \frac{EI \alpha \Delta t}{h}$$

$$\frac{d^2y}{dx^2} = \frac{d\theta}{dx} = \frac{1}{\rho} = \frac{\alpha \Delta t}{h} = \frac{M_T}{EI}$$

Próxima Clase: Problemas Estáticamente Indeterminados, Trabajo de las Fuerzas Interiores, Energía Potencial de la Deformación en la Flexión

Fin