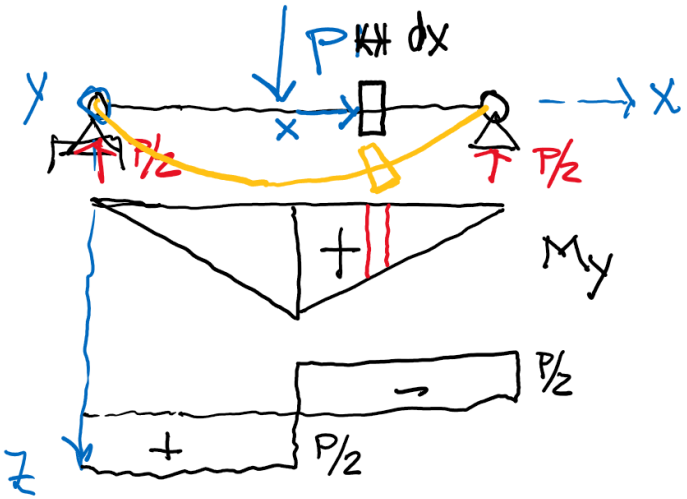
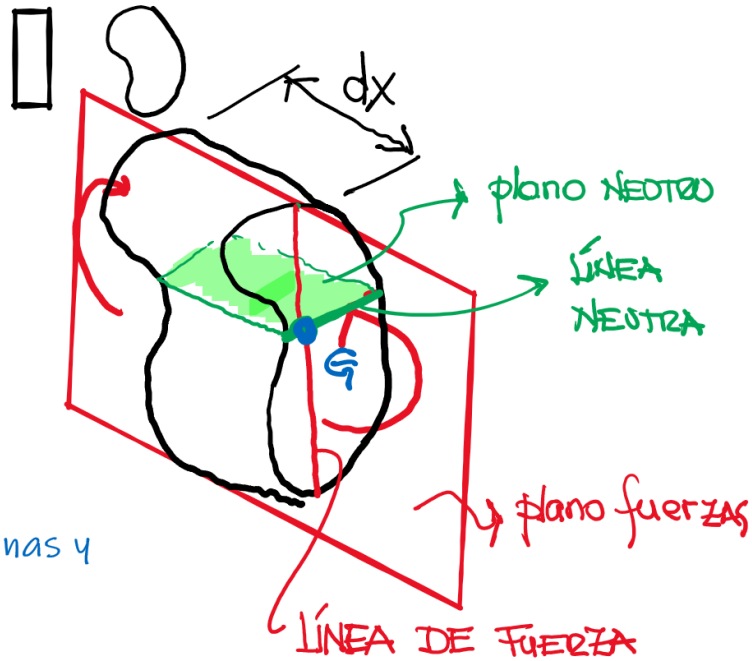
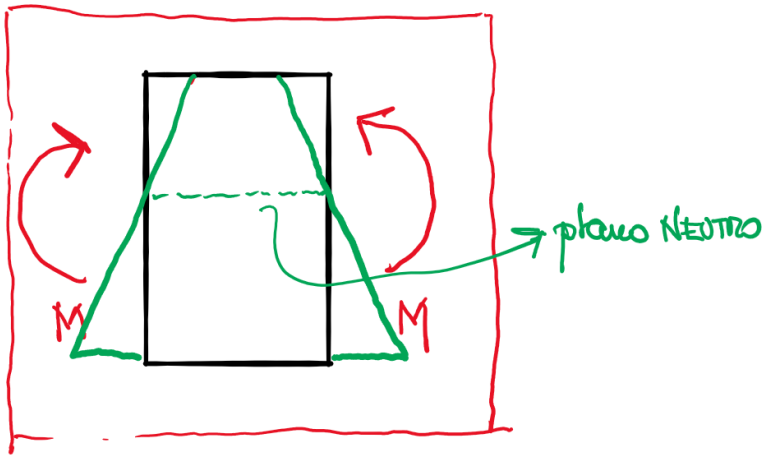
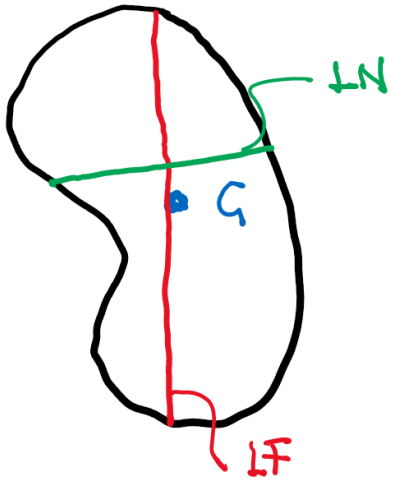
BARRAS SOLICITADAS A FLEXION



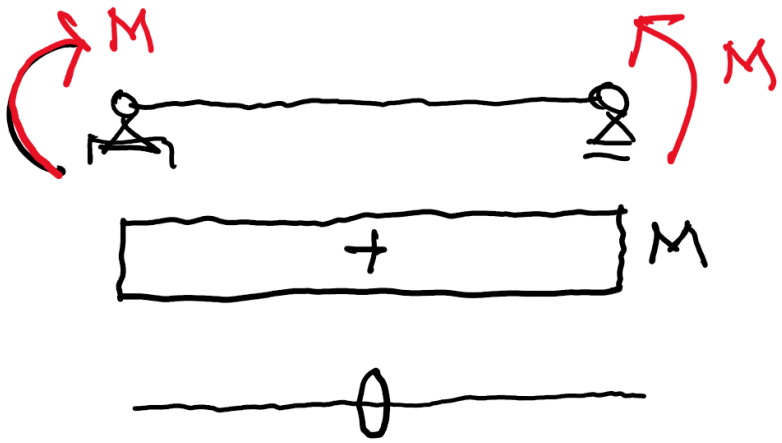


HIPOTESIS: Secciones se mantienen planas y perpendiculares al eje de barra





clasificacion de flexión



Flexion constante $M \neq 0$ $Q = 0$

Flexion variable $M \neq 0$ $Q \neq 0$

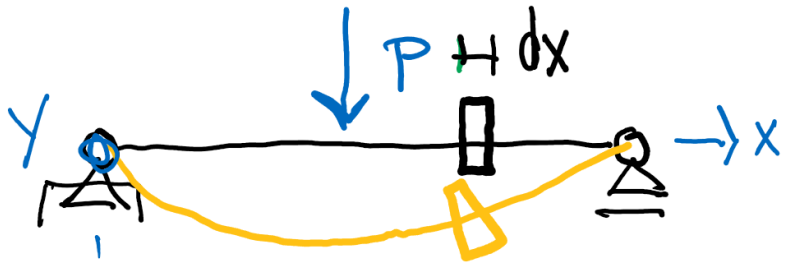
Flexión Simple $M \neq 0$ $N = 0$

Flexión Compuesta $M \neq 0$ $N \neq 0$

Flexión RECTA — M COINCIDE CON EPI

Flexión OBLICUA — M NO COINCIDE CON EPI

Estudio de la deformación



$$\varepsilon_x = \frac{du}{dx}$$

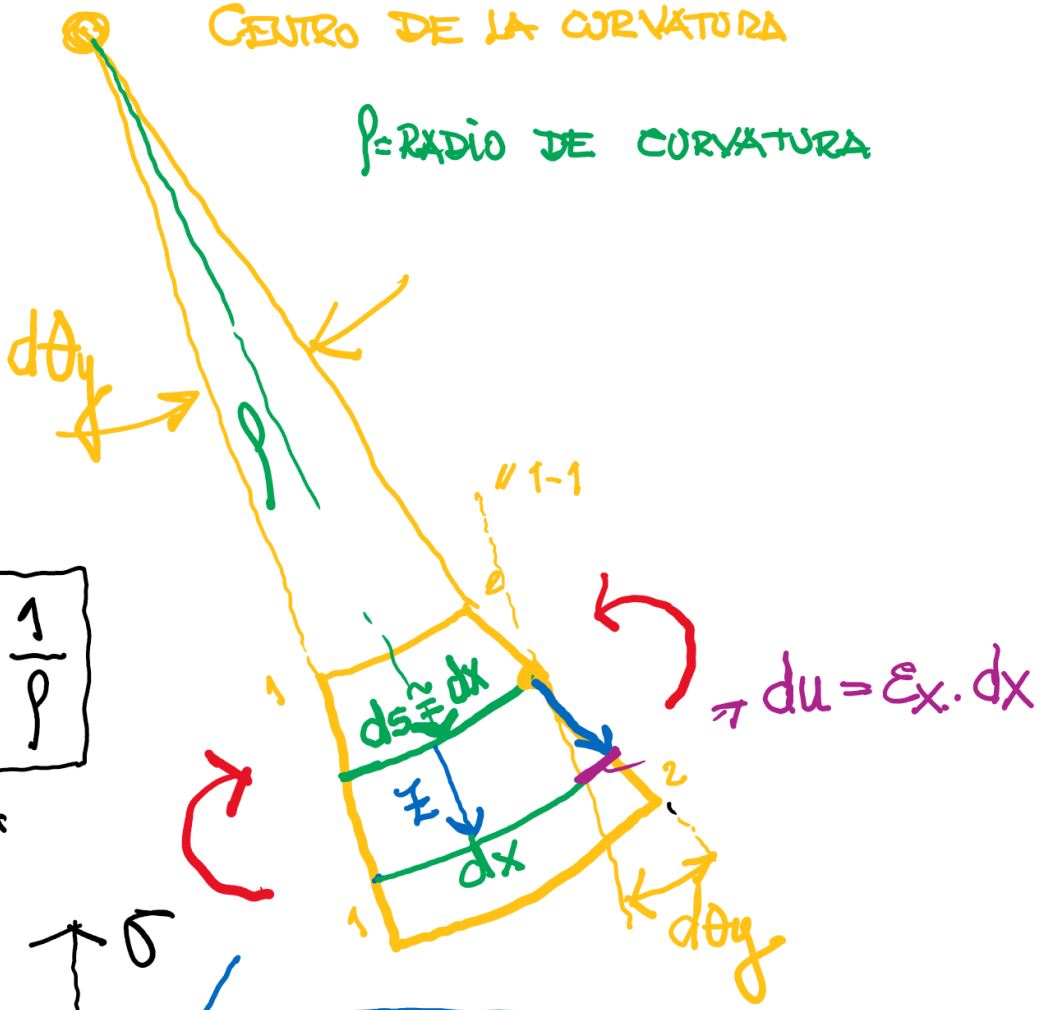
$$\rho \cdot d\theta_y = dx \rightarrow \boxed{\chi_y = \frac{d\theta_y}{dx} = \frac{1}{\rho}}$$

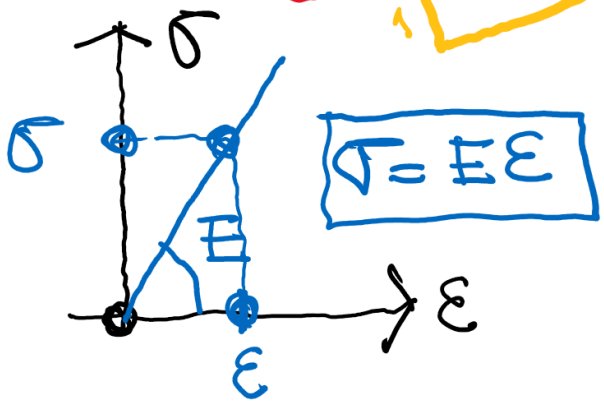
CURVATURA

$$z \cdot d\theta_y = du = \varepsilon_x \cdot dx$$

$$z \cdot \frac{d\theta_y}{dx} = \boxed{\varepsilon_x = \chi_y \cdot z}$$

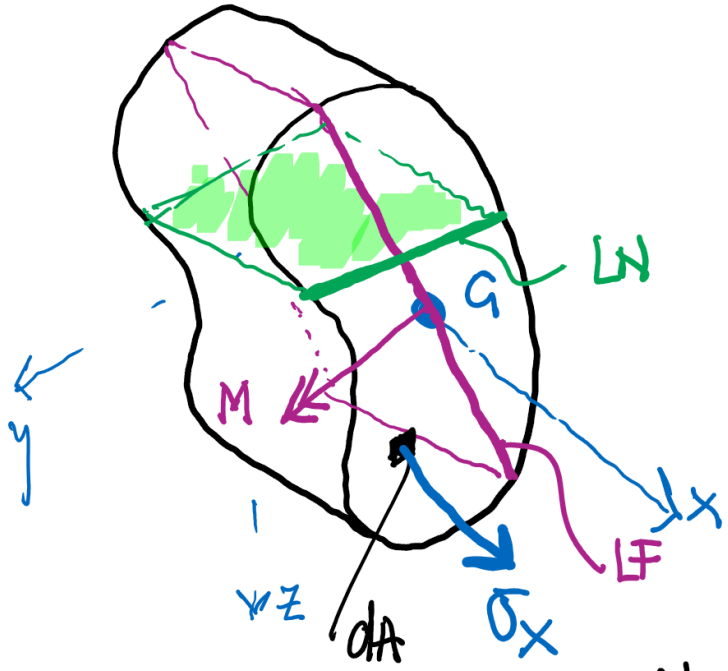
$$\boxed{\sigma_x = E \cdot \chi \cdot z}$$

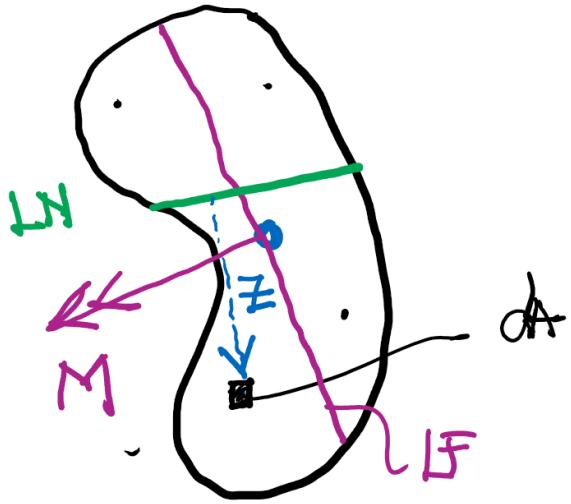




$$\boxed{\sigma = E\varepsilon}$$

Ecuaciones de equivalencia



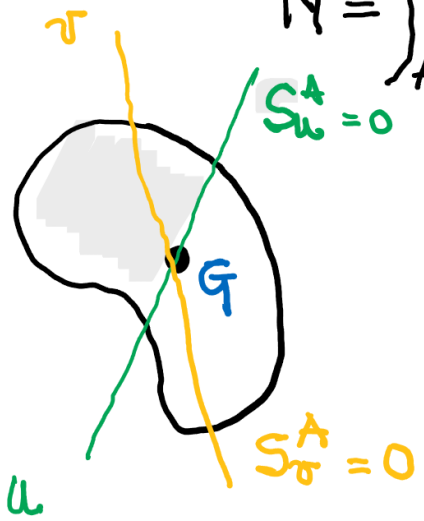


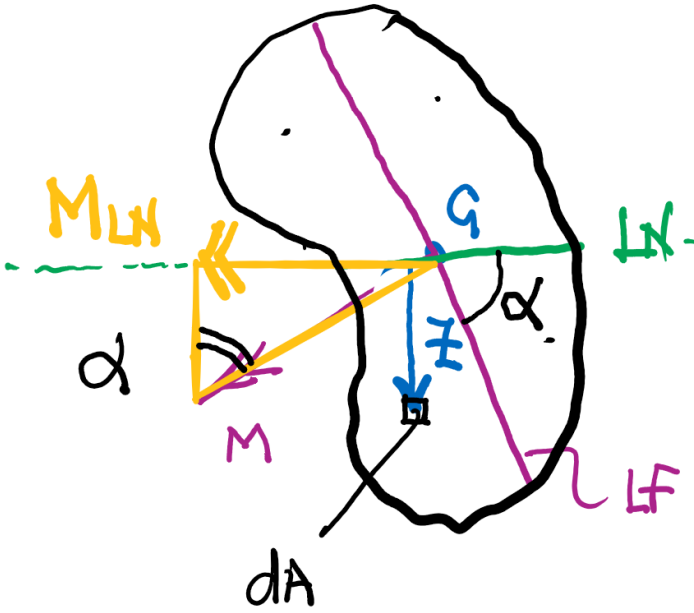
FLEXIÓN SIMPLE

$$N = \int_A \sigma_x \cdot dA = \int_A E \cdot \chi_y \cdot z \cdot dA = E \cdot \chi_y \int_A z \cdot dA = 0$$

$$\Leftarrow S_{LN}^{A} = 0$$

LN pasa x G





$$M_{LN} = \int_A \sigma_x \cdot dA \cdot Z = M \cdot \operatorname{sen}\alpha$$

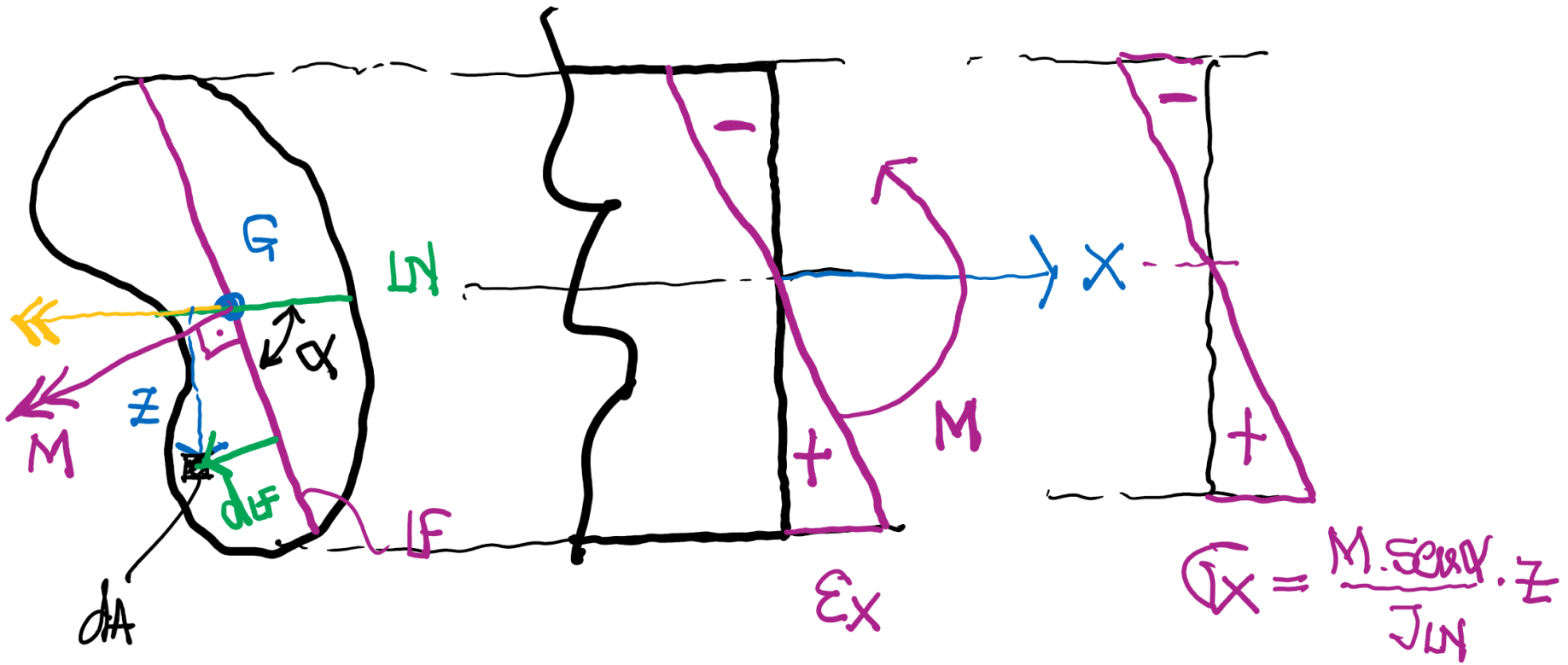
α: ángulo entre LF y LN

$$M \operatorname{sen}\alpha = \int_A E \cdot \chi_y \cdot Z^2 \cdot dA = E \chi_y \int_A Z^2 dA$$

J_{LN}

$$\boxed{\chi_y = \frac{M \operatorname{sen}\alpha}{E \cdot J_{LN}} = \frac{d\theta_e}{dx}}$$

$$\boxed{\sigma_x = \frac{M \cdot \operatorname{sen}\alpha}{J_{LN}} \cdot Z}$$



$$M_{LF} = \int_A \sigma_x \cdot dA \cdot d_{LF} = \int_A E \cdot \chi_y \cdot z \cdot d_{LF} \cdot dA = E \chi_y \int_A z \cdot d_{LF} \cdot dA = 0$$

$$\int_A z \cdot d_{LF} \cdot dA \rightarrow J_{LN;LF} = 0$$

LN y LF SON EJES CONJUGADOS ←