
Mecánica de Materiales II: Esfuerzos combinados

Andrés G. Clavijo V., Universidad Simón Bolívar


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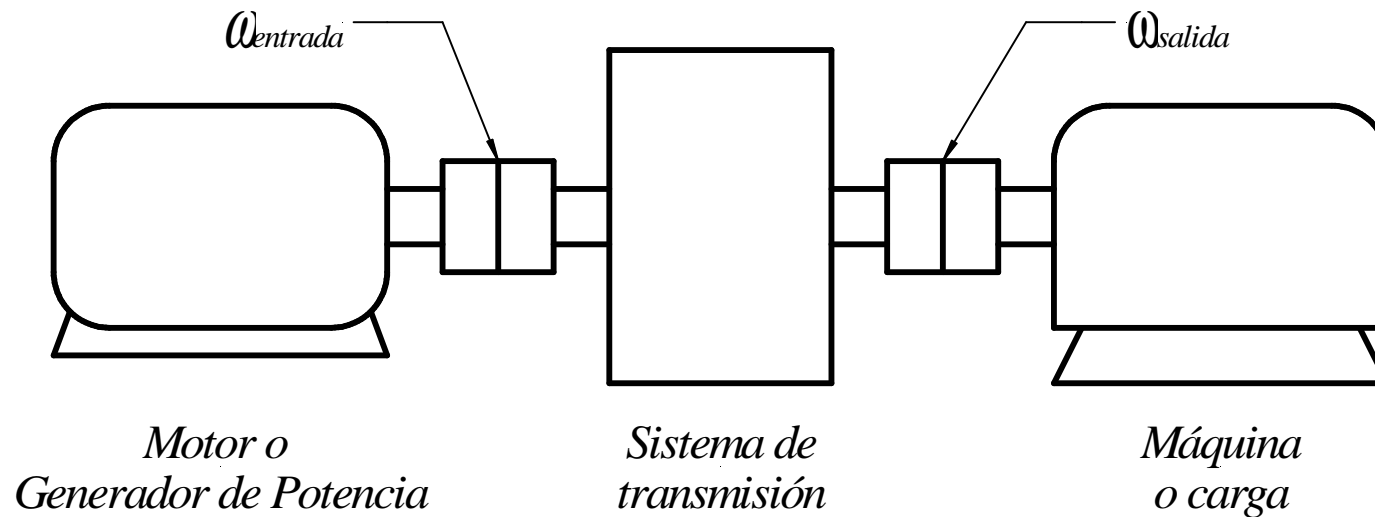


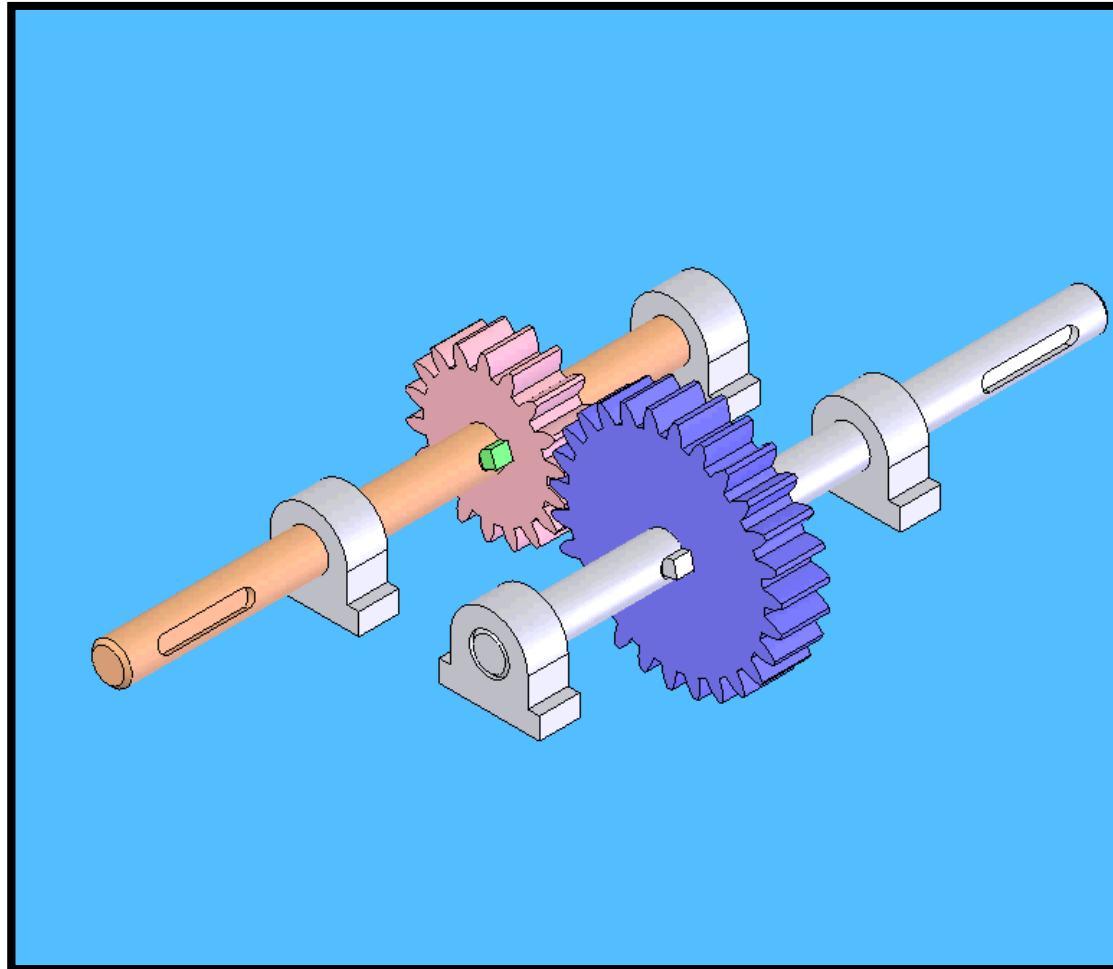
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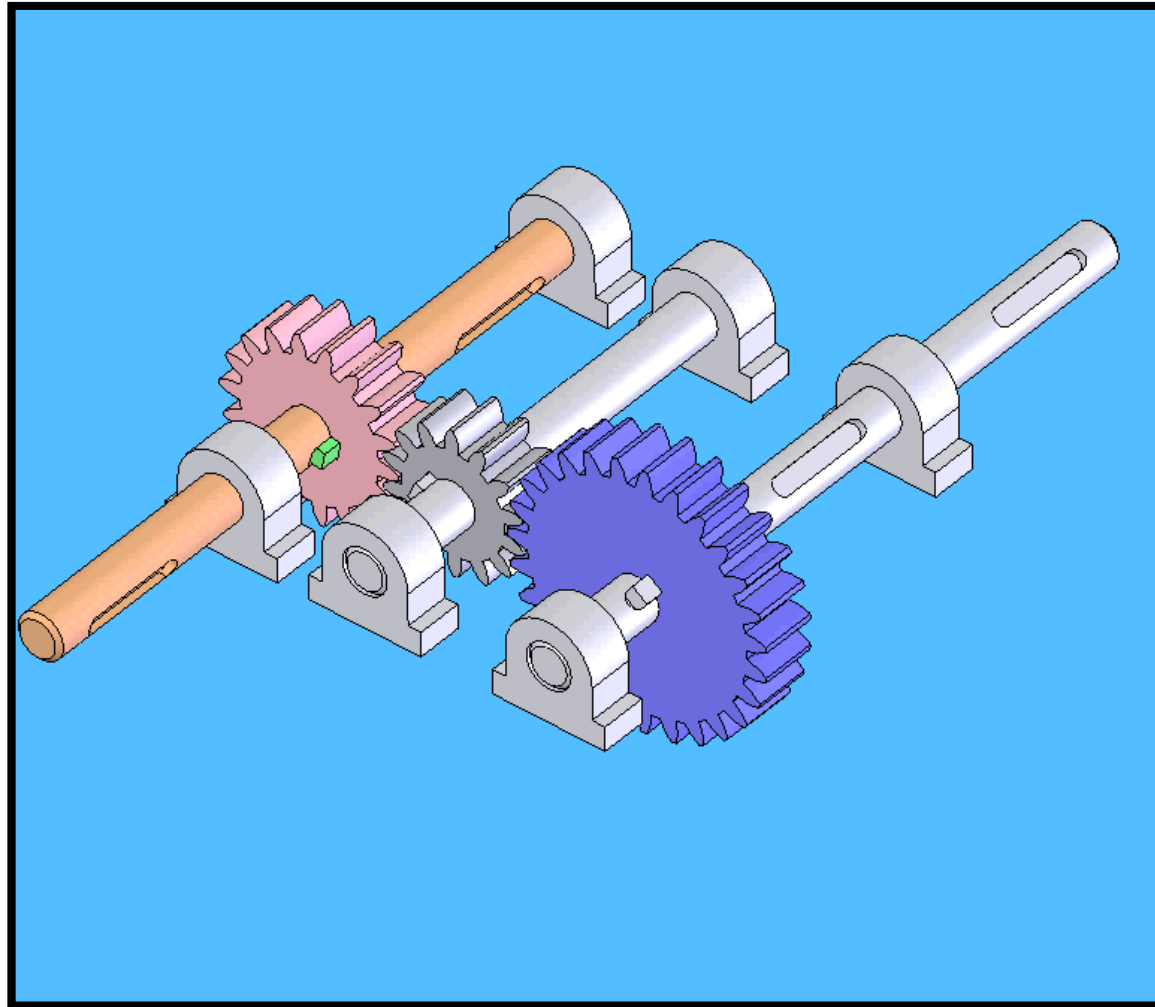


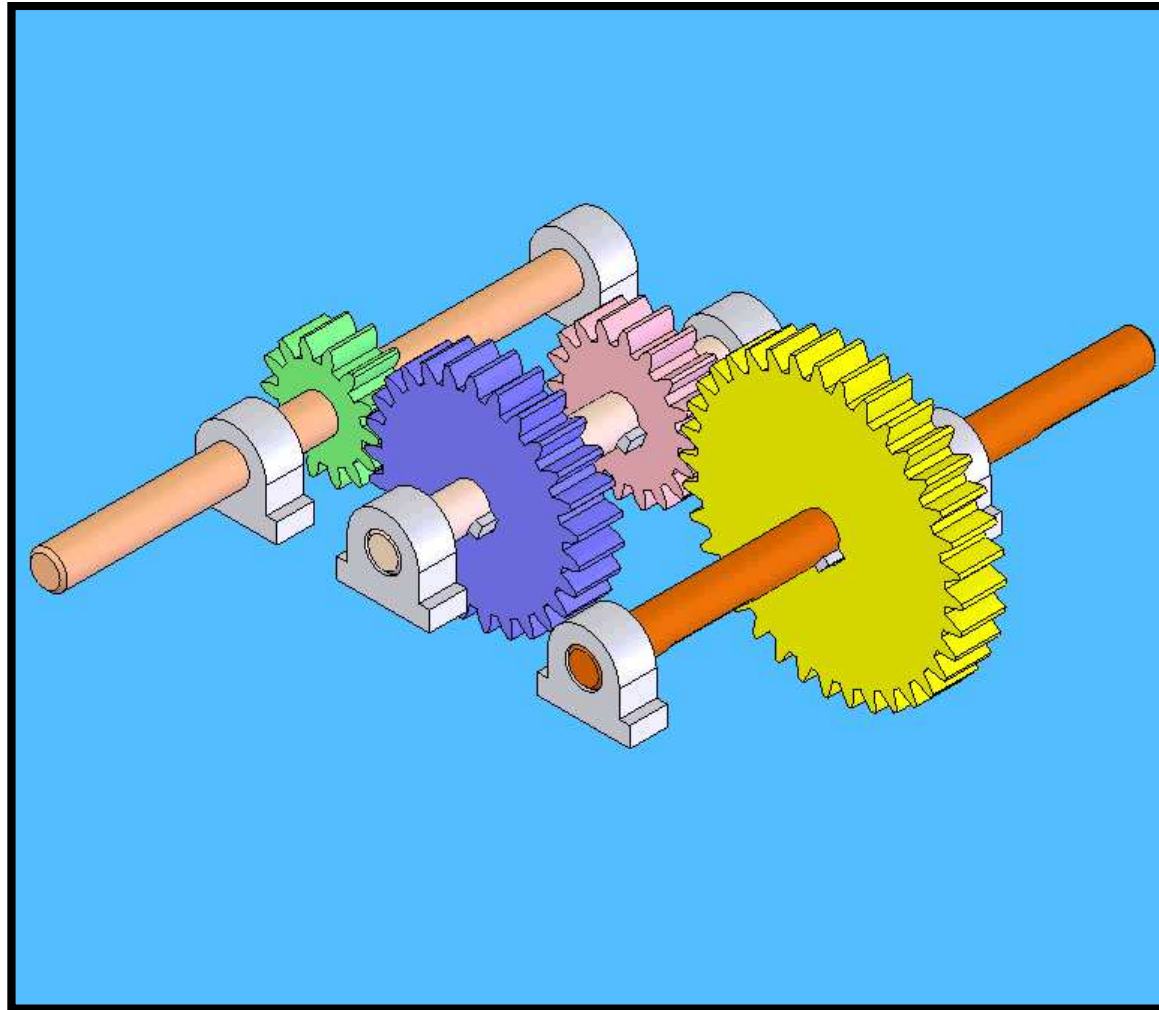
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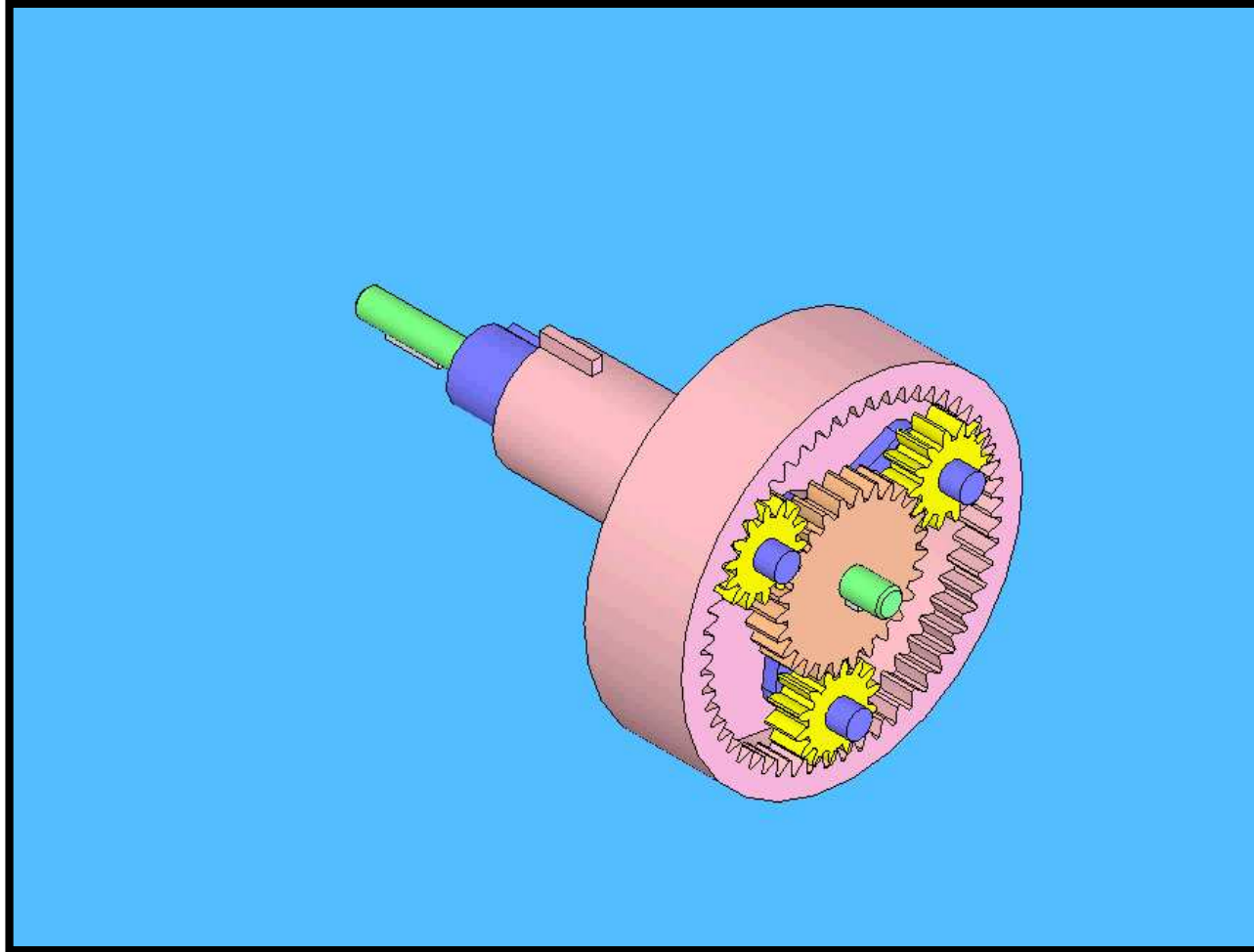
Son casos reales en los que confluyen los efectos de diferentes tipos de cargas: Flexión, torsión, corte y axial

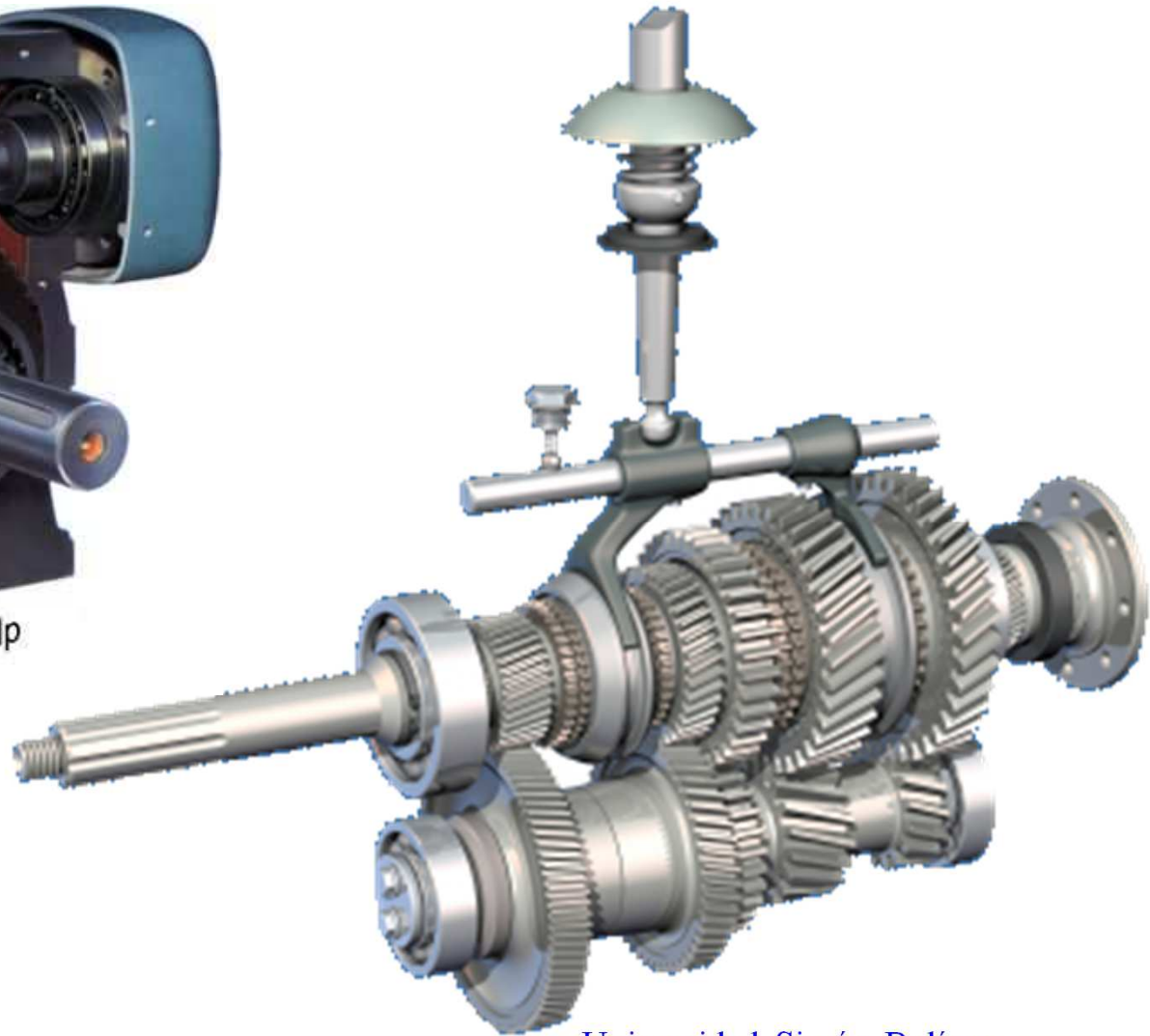


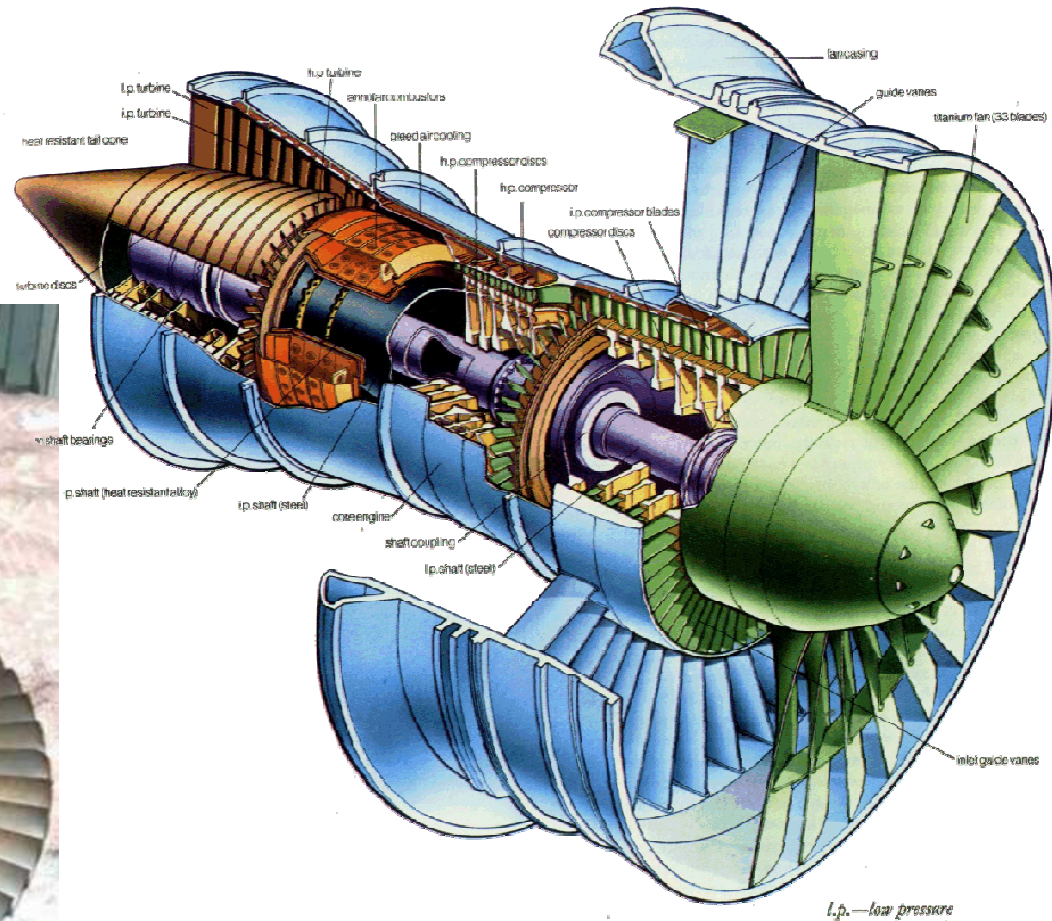










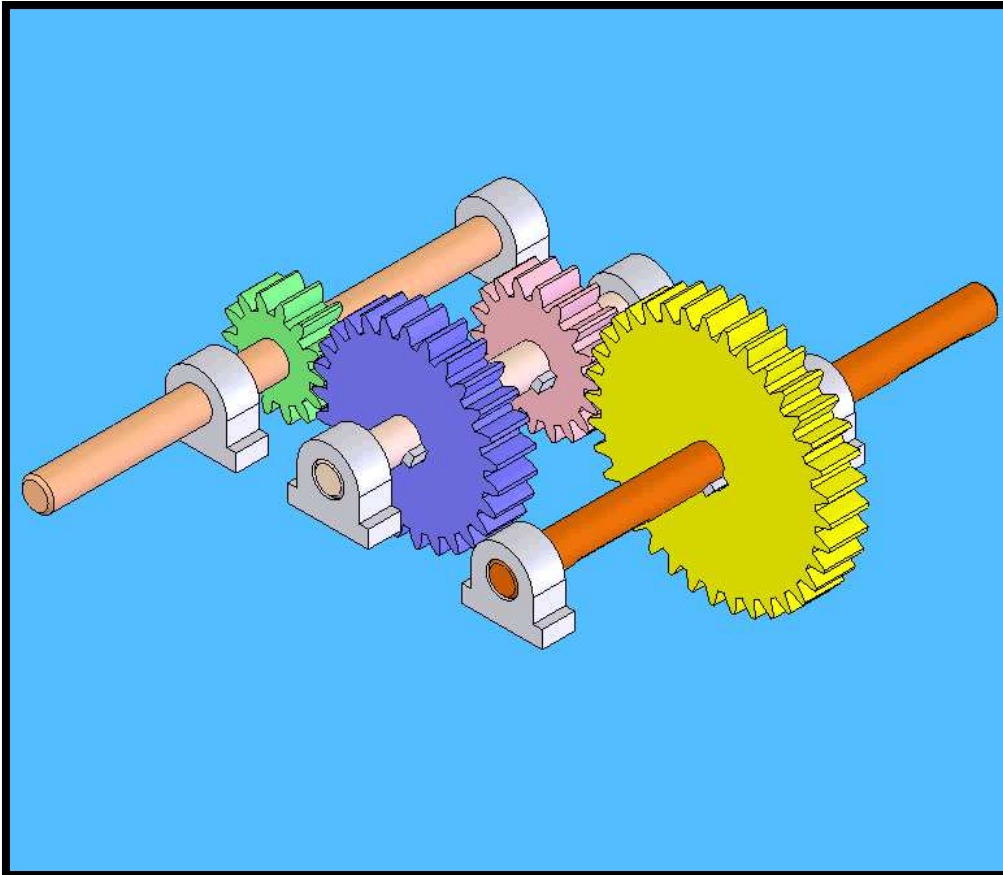


Introducción

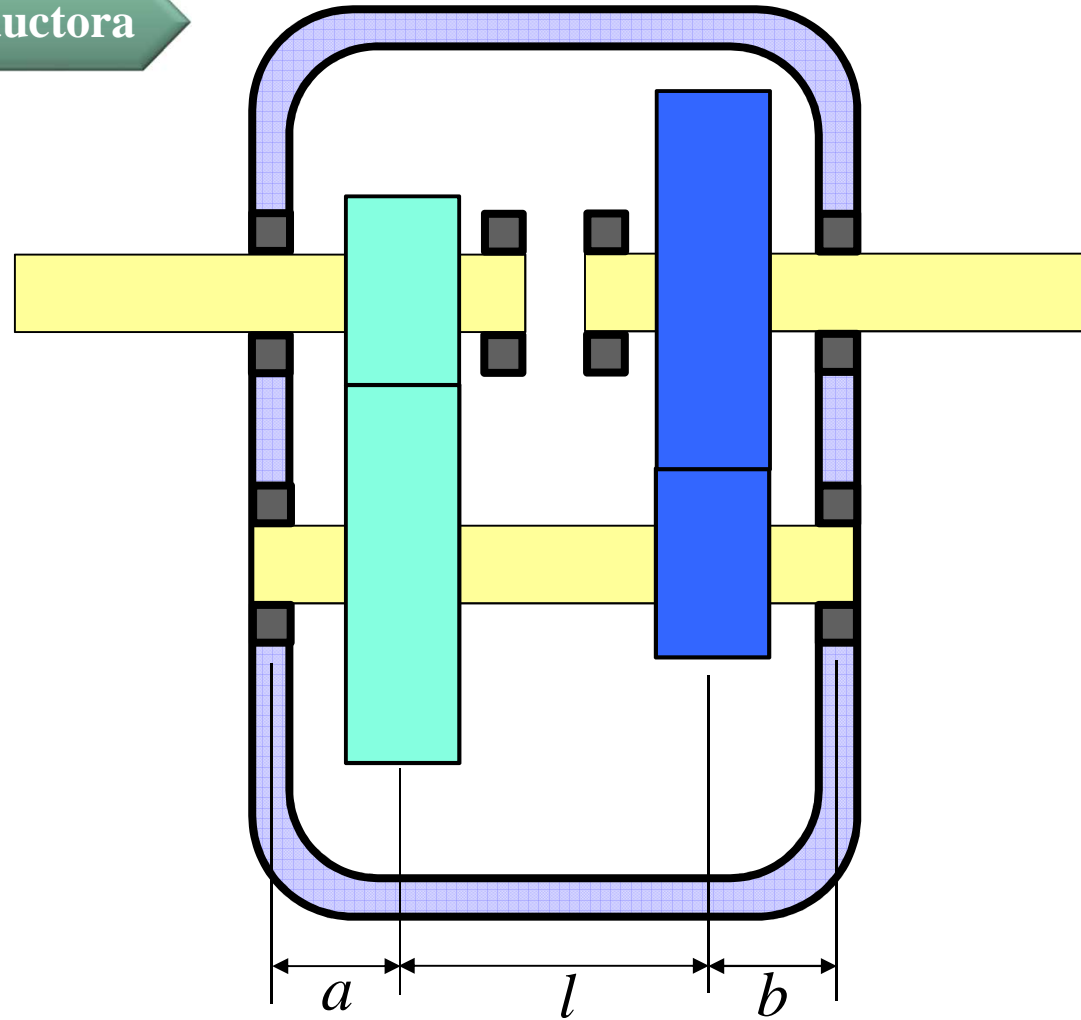
Ejemplos de Esfuerzos Combinados

Casos de estudio

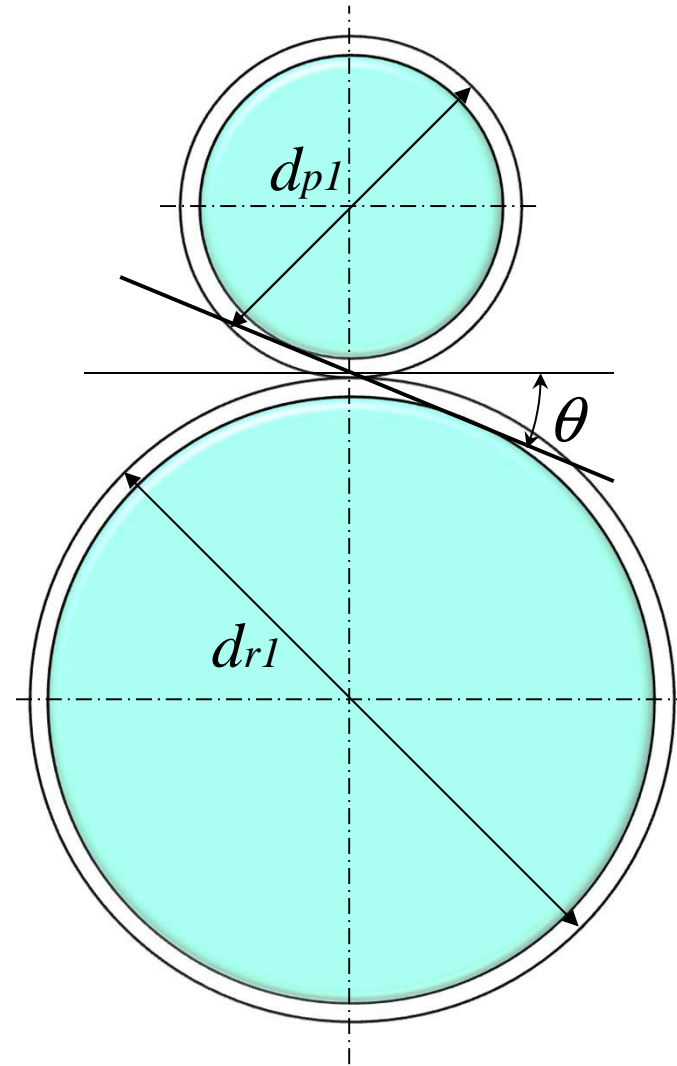




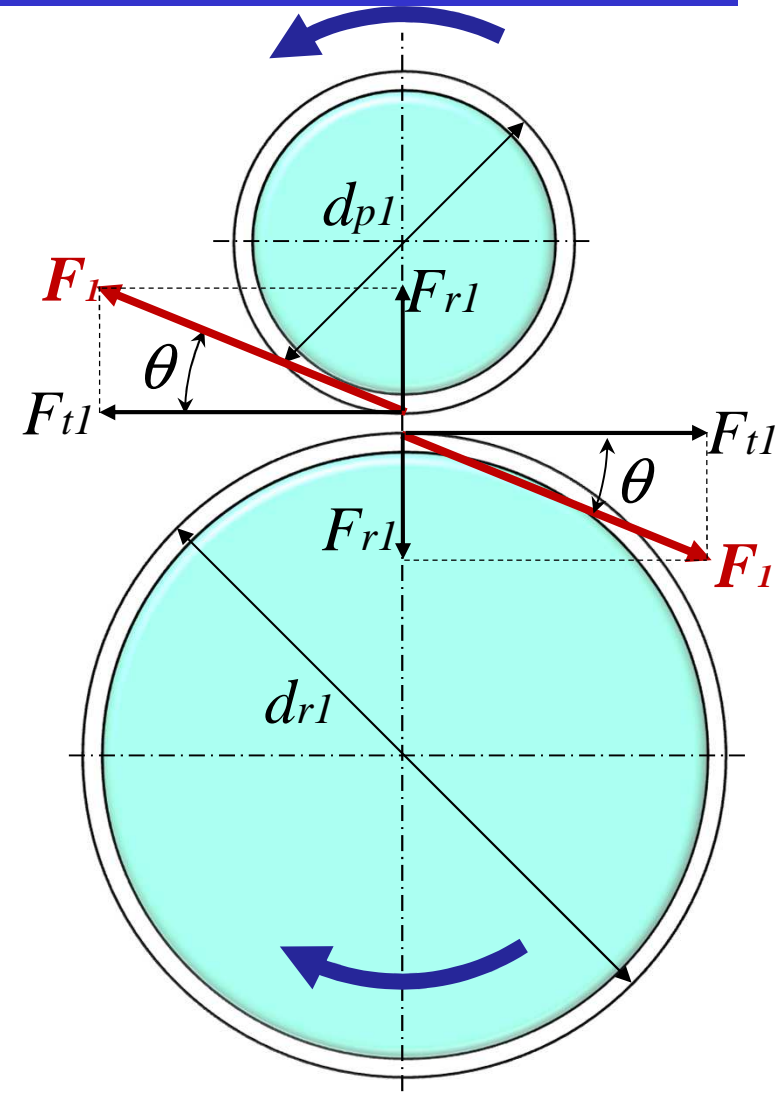
Caja reductora



Caja reductora

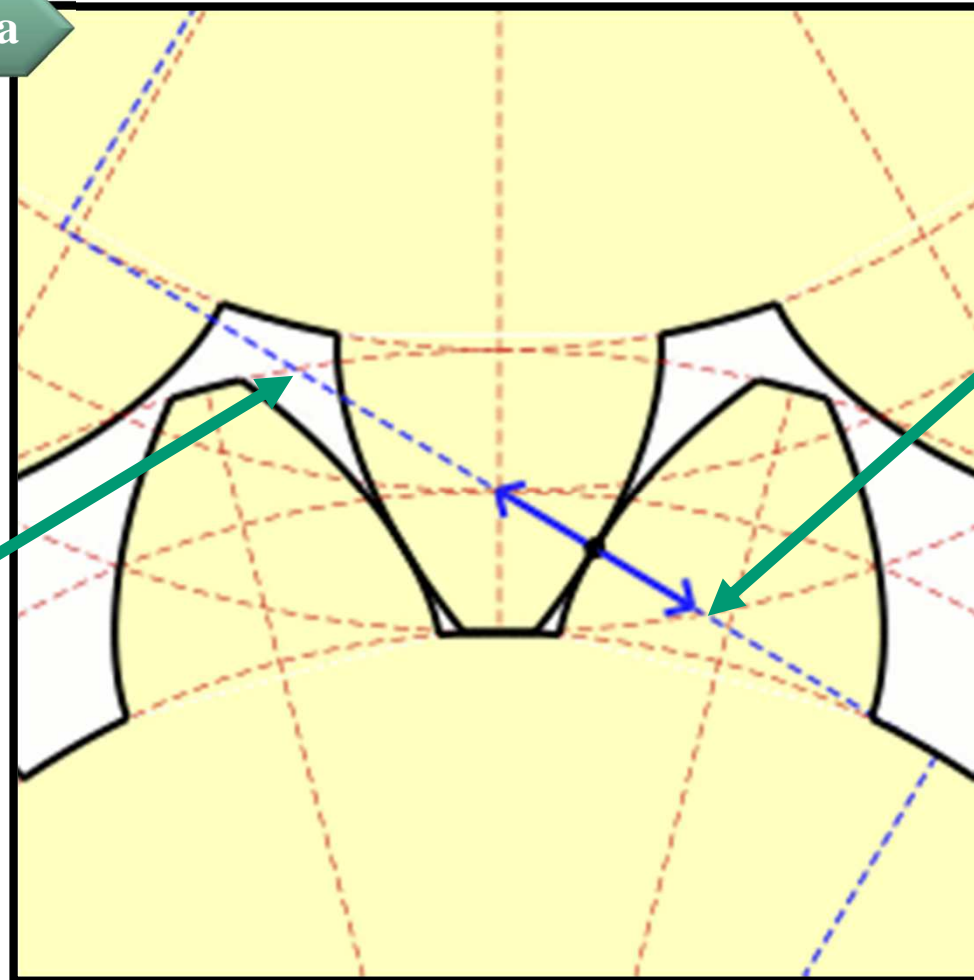


Caja reductora

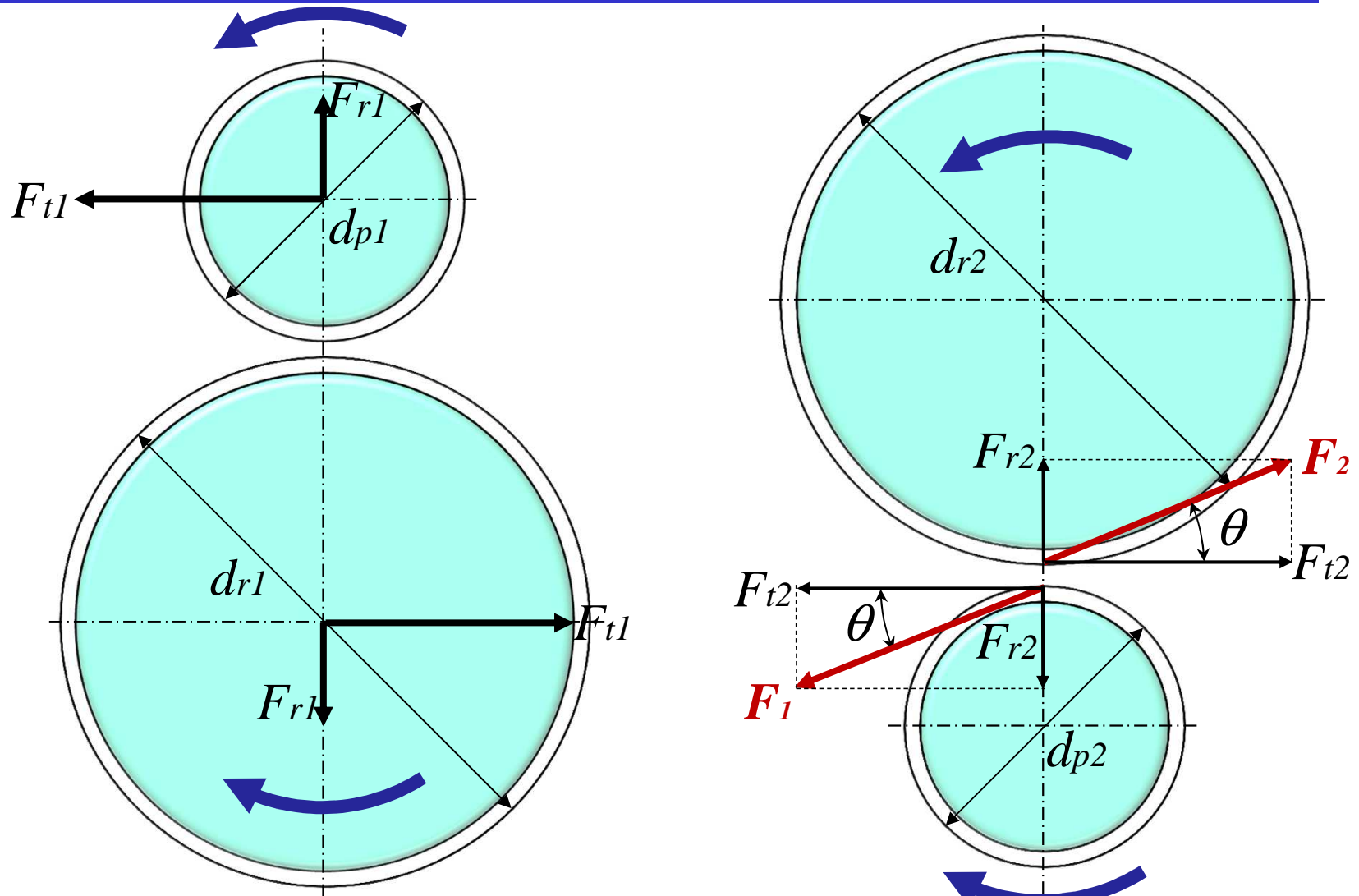


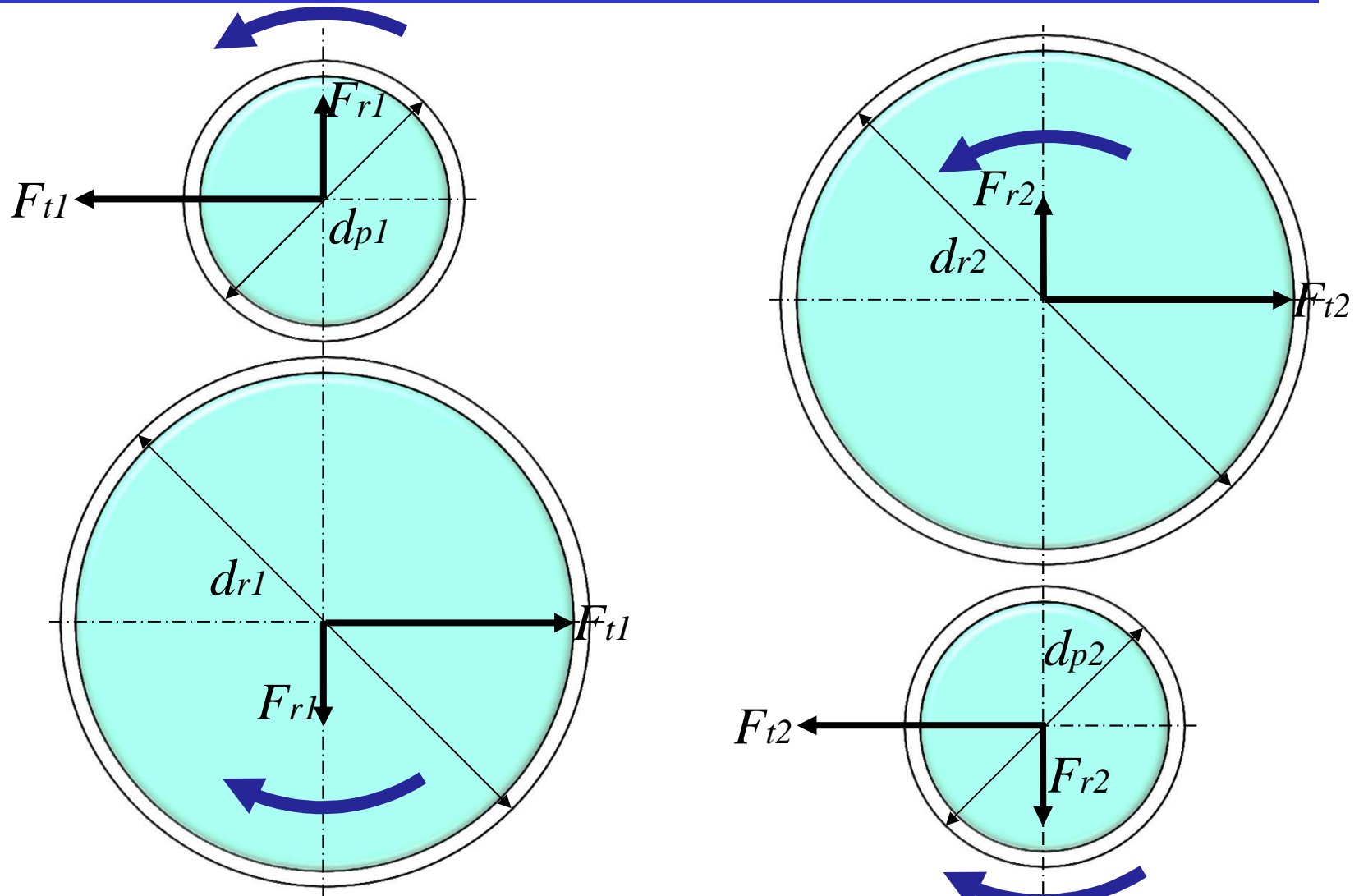
Caja reductora

Punto inicial
de contacto

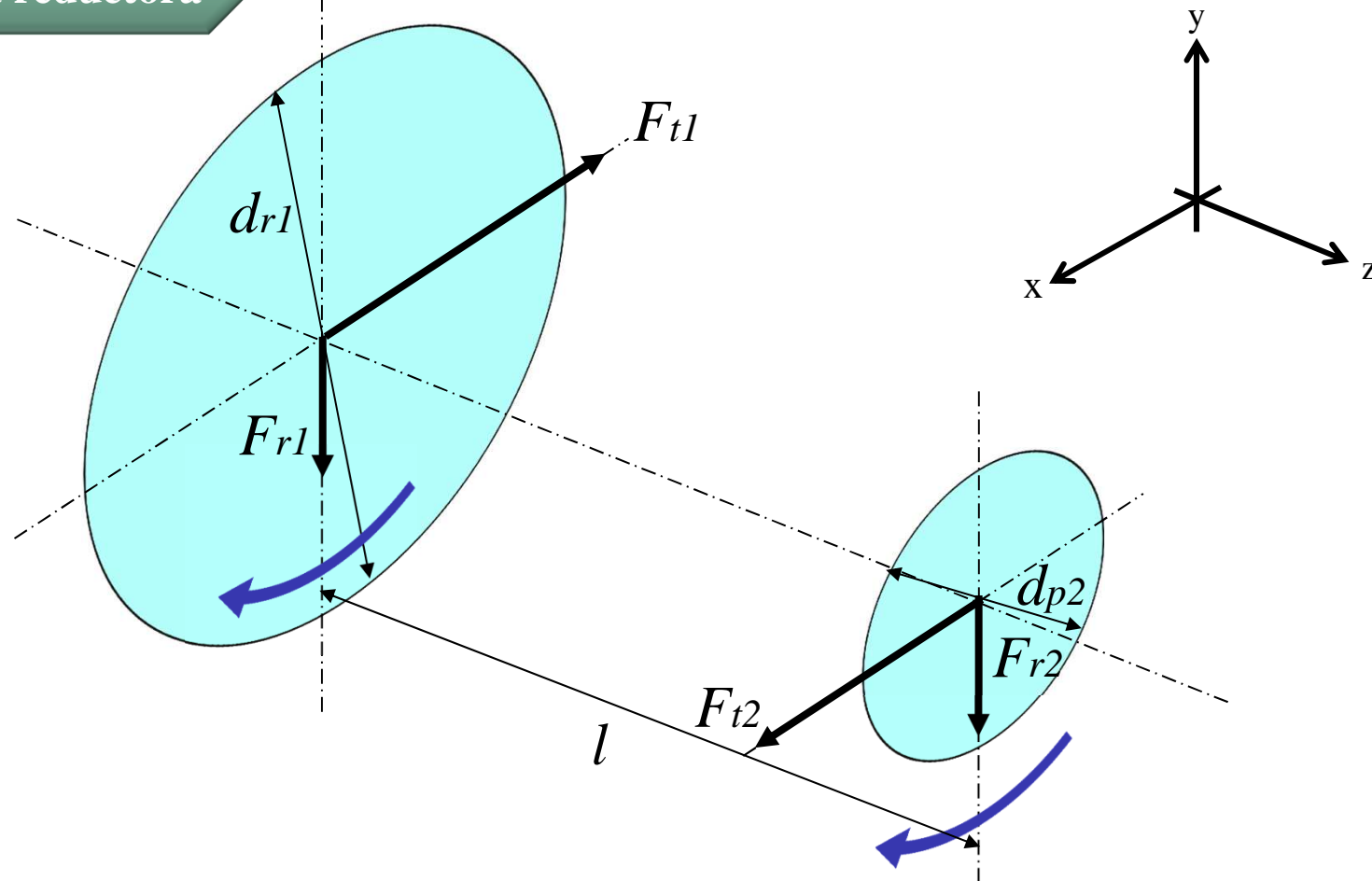


Punto final
de contacto





Caja reductora



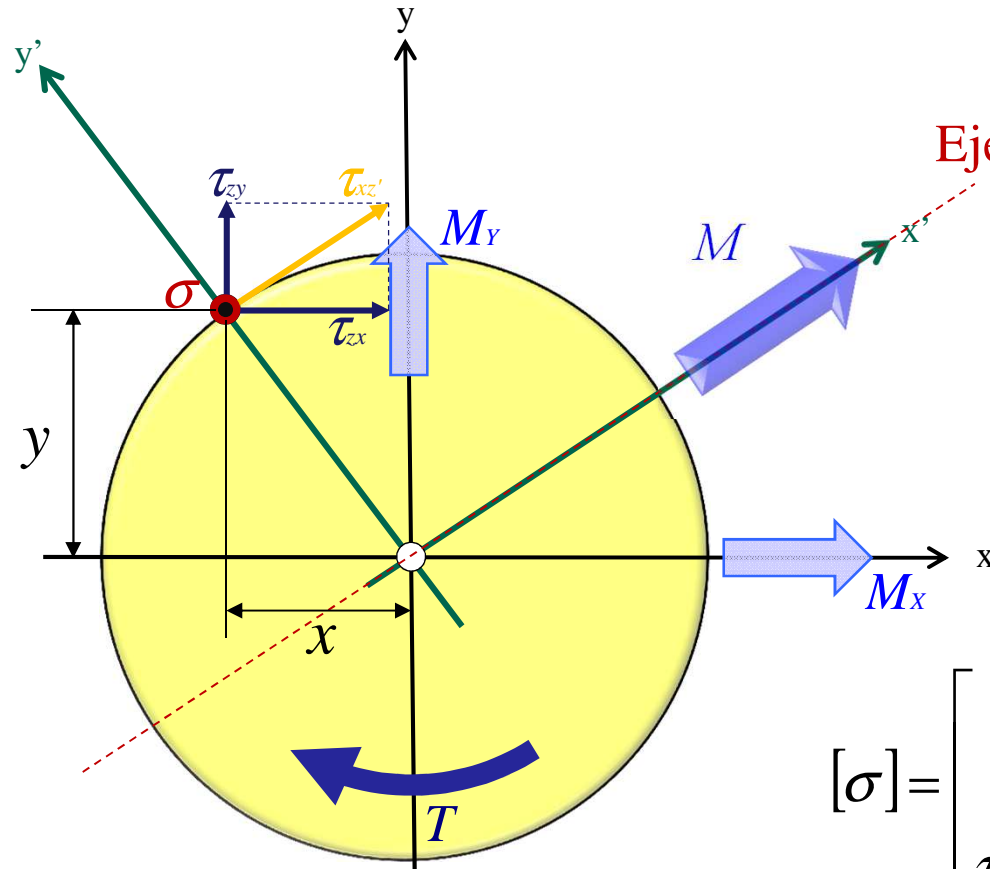
Caja reductora

$$\sigma = \frac{M_x \cdot y}{I_x} + \frac{M_y \cdot x}{I_y}$$

$$\tau_{zx} = \frac{T \cdot y}{J}$$

$$\tau_{zy} = \frac{T \cdot x}{J}$$

$$[\sigma] = \begin{bmatrix} 0 & 0 & \tau_{xz} \\ 0 & 0 & \tau_{yz} \\ \tau_{zx} & \tau_{zy} & \sigma_z \end{bmatrix}$$



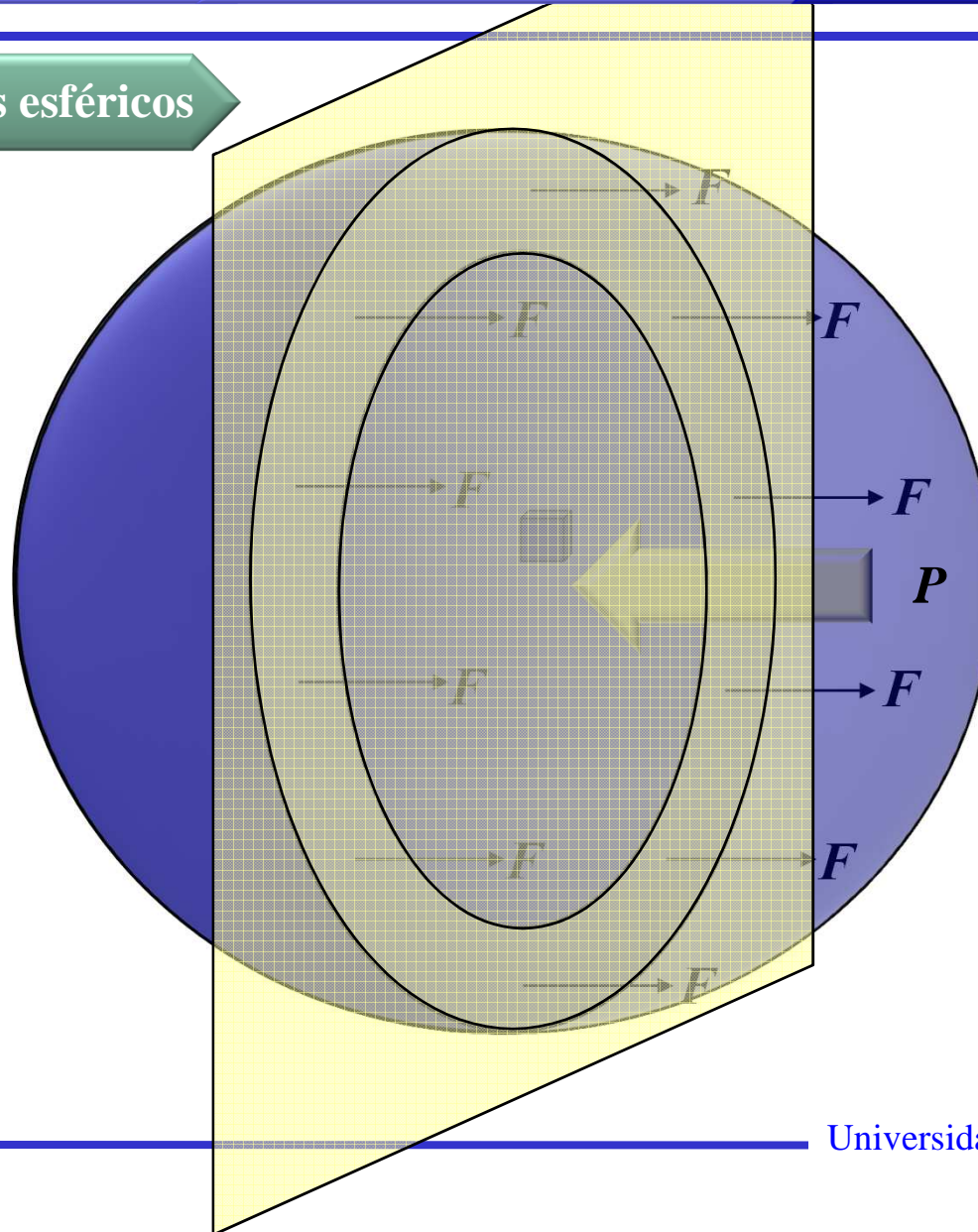
$$\sigma = \frac{M \cdot d/2}{I_{x'}}$$

Eje neutro

$$\tau_{xz'} = \frac{T \cdot d/2}{J}$$

$$[\sigma] = \begin{bmatrix} 0 & 0 & \tau_{xz'} \\ 0 & 0 & 0 \\ \tau_{zx'} & 0 & \sigma_z \end{bmatrix}$$

Recipientes esféricos



$$F = \sigma \cdot \pi \cdot d \cdot t$$

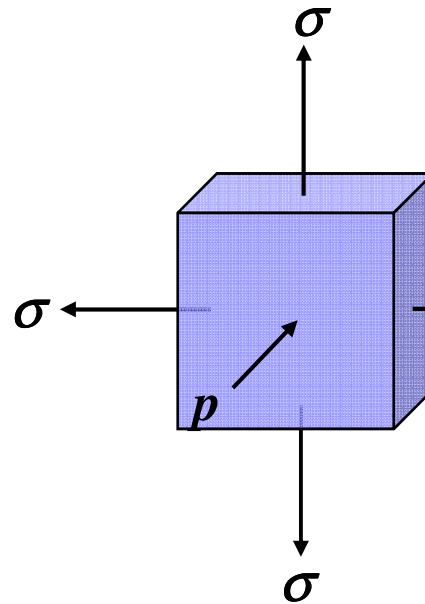
$$P = p \cdot \pi \cdot \frac{d^2}{4}$$

Recipientes esféricos

Elemento infinitesimal

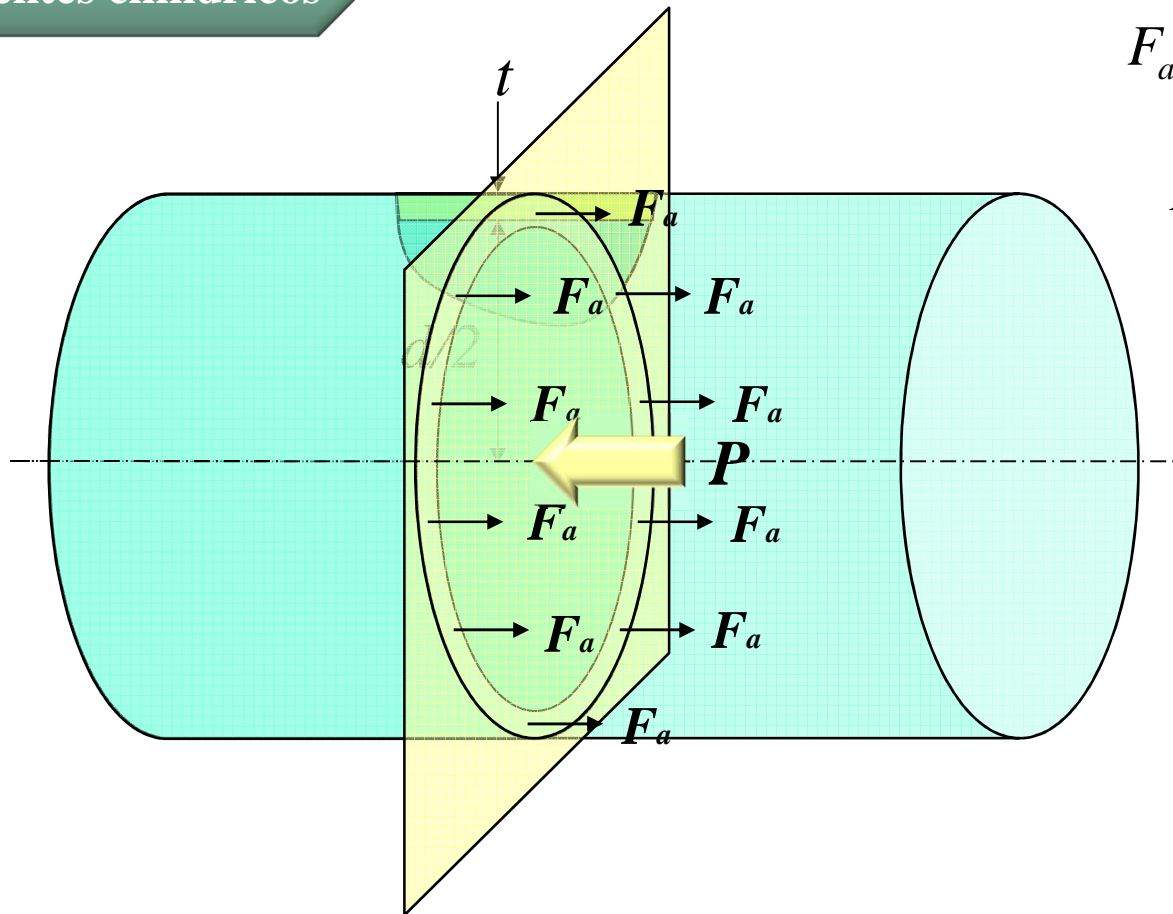
$$\sigma = \frac{p \cdot d}{4 \cdot t}$$

$$\sigma_r = -p$$



$$[\sigma] = \begin{bmatrix} \sigma_1 p & 0 & 0 & 0 \\ 0 & \sigma_2 \frac{p \cdot d}{4 \cdot t} & 0 & 0 \\ 0 & 0 & 0 & \sigma_3 \\ 0 & 0 & 0 & \frac{p \cdot d}{4 \cdot t} \end{bmatrix}$$

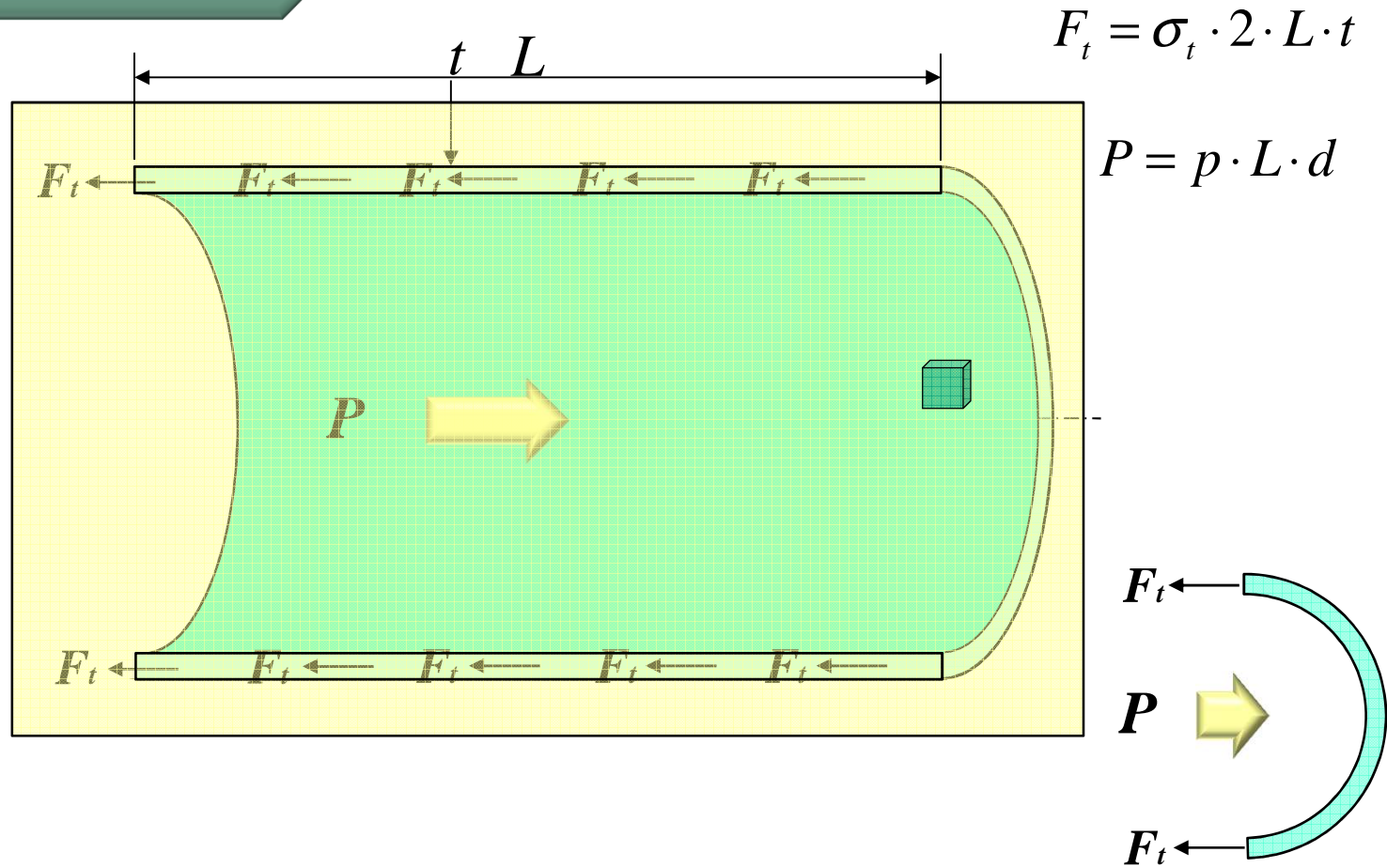
Recipientes cilíndricos



$$F_a = \sigma_a \cdot \pi \cdot d \cdot t$$

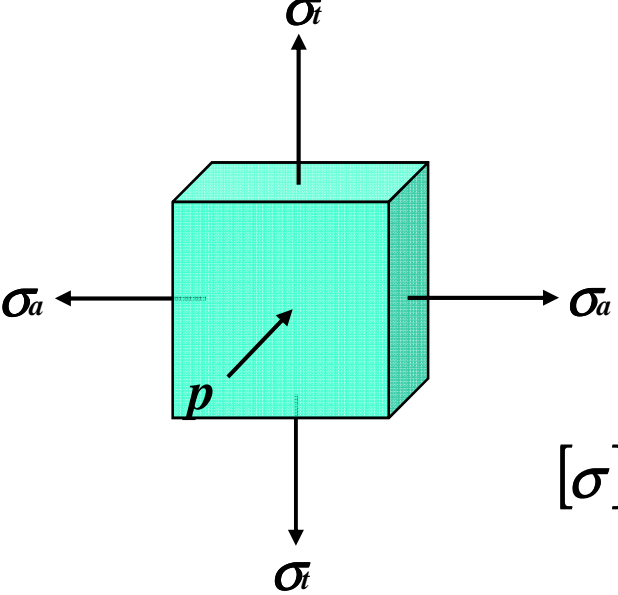
$$P = p \cdot \pi \cdot \frac{d^2}{4}$$

Recipientes cilíndricos



Recipientes cilíndricos

Elemento infinitesimal



$$[\sigma] = \begin{bmatrix} \sigma_1 p & 0 & 0 & 0 \\ 0 & \sigma_2 \frac{p \cdot d}{4 \cdot t} & 0 & 0 \\ 0 & 0 & 0 & \sigma_3 \frac{p \cdot d}{2 \cdot t} \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\sigma_a = \frac{p \cdot d}{4 \cdot t}$$

$$\sigma_t = \frac{p \cdot d}{2 \cdot t}$$

$$\sigma_r = -p$$