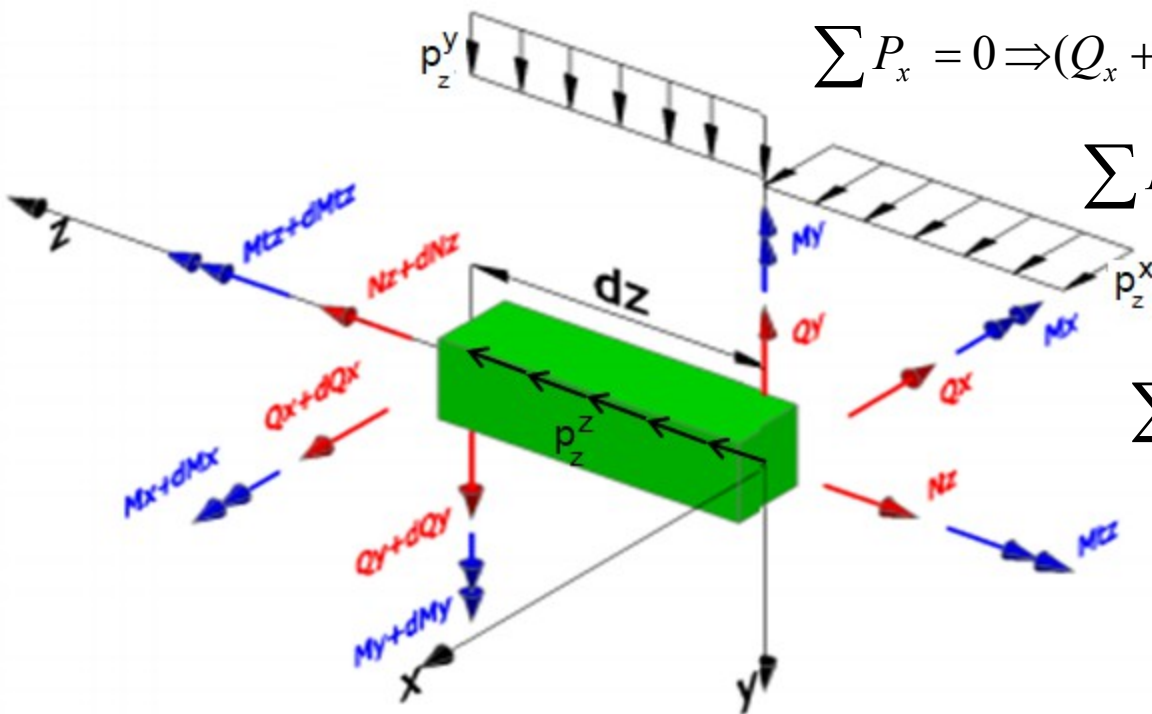


RELACIONES DIFERENCIALES



$$\sum P_x = 0 \Rightarrow (Q_x + dQ_x) + p_z^x \cdot dz - Q_x = 0 \quad 1) p_z^x = \frac{-dQ_x}{dz}$$

$$\sum P_y = 0 \Rightarrow (Q_y + dQ_y) + p_z^y \cdot dz - Q_y = 0$$

$$2) p_z^y = \frac{-dQ_y}{dz}$$

$$\sum P_z = 0 \Rightarrow (N_z + dN_z) + p_z^z \cdot dz - N_z = 0$$

$$3) p_z^z = \frac{-dN_z}{dz}$$

$$\sum M_x = 0 \Rightarrow (M_x + dM_x) - p_z^y \cdot dz \cdot \frac{dz}{2} - M_x - (Q_y + dQ_y) \cdot dz = 0$$

$$4) Q_y = \frac{dM_x}{dz}$$

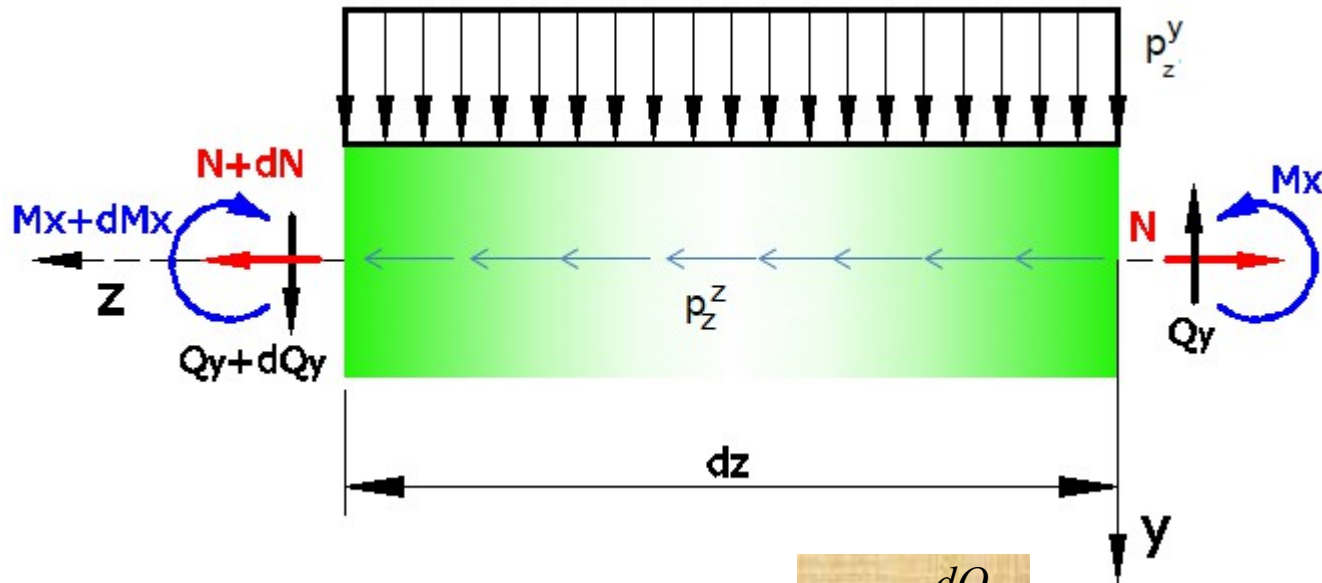
$$\sum M_y = 0 \Rightarrow (M_y + dM_y) + p_z^x \cdot dz \cdot \frac{dz}{2} - M_y + (Q_x + dQ_x) \cdot dz = 0$$

$$5) Q_x = -\frac{dM_y}{dz}$$

$$\sum M_z = 0 \Rightarrow (M_{tz} + dM_{tz}) - M_{tz} = 0$$

$$6) dM_t = 0$$

Sistemas Planos: Relaciones diferenciales para el plano z-y



$$\sum P_y = 0 \Rightarrow (Q_y + dQ_y) + p_z^y \cdot dz - Q_y = 0 \quad p_z^y = \frac{-dQ_y}{dz}$$

$$\sum P_z = 0 \Rightarrow (N_z + dN_z) + p_z^z \cdot dz - N_z = 0 \quad p_z^z = \frac{-dN_z}{dz}$$

$$\sum M_x = 0 \Rightarrow (M_x + dM_x) - p_z^y \cdot dz \cdot \frac{dz}{2} - M_x - (Q_y + dQ_y) \cdot dz = 0 \quad Q_y = \frac{dM_x}{dz}$$