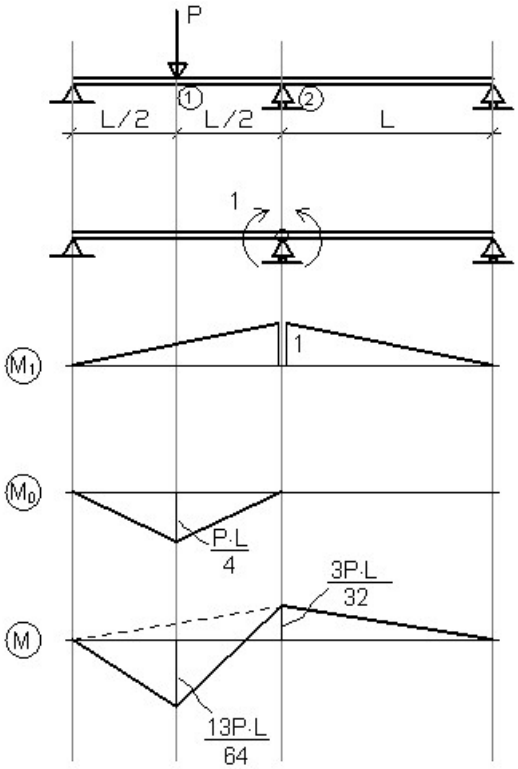
Rugalmas analízis: erő–módszer



$$\bar{a}_{11} \cdot X_1 + \bar{a}_{10} = 0$$

$$\bar{a}_{11} = \int M_1^2 ds = 2\left[\frac{L}{2} \cdot \frac{2}{3}\right] = \frac{2L}{3}$$

$$\bar{a}_{10} = \int M_0 \cdot M_1 ds =$$

$$= \left[\frac{PL}{4} \cdot \frac{L}{2} \cdot \frac{1}{2}\right]\frac{1}{2} \cdot \frac{2}{3} + \left[\frac{PL}{4} \cdot \frac{L}{2} \cdot \frac{1}{2}\right] \cdot \frac{2}{3} = \frac{PL^2}{16}$$

$$X_1 = -\frac{\bar{a}_{10}}{\bar{a}_{11}} = \frac{\frac{PL^2}{16}}{\frac{2L}{3}} = \frac{3PL}{32} = M_2$$

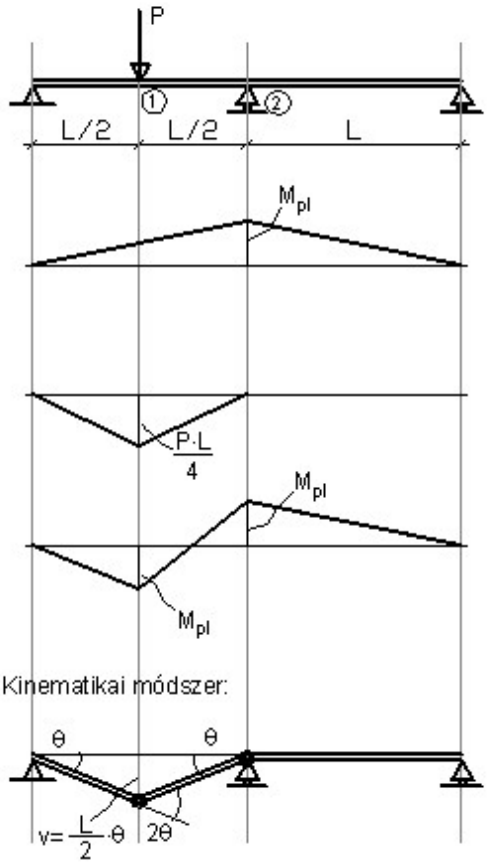
$$M_1 = \frac{PL}{4} - \frac{1}{2}M_2 = \frac{PL}{4} - \frac{1}{2} \cdot \frac{3PL}{32} = \frac{13PL}{64}$$

$$P_y = \frac{64}{13L} \cdot M_y$$

$$M_y = W_{el,y} \cdot f_y$$

Képlékeny analízis

Statikai módszer:



$$M_1: \ \frac{PL}{4} - \frac{M_{pl}}{2} = M_{pl}$$

$$M_2: \ -M_{pl}$$

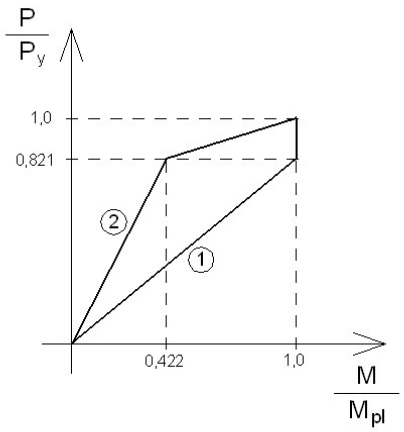
$$P_u = \frac{6}{L} M_{pl,y}$$

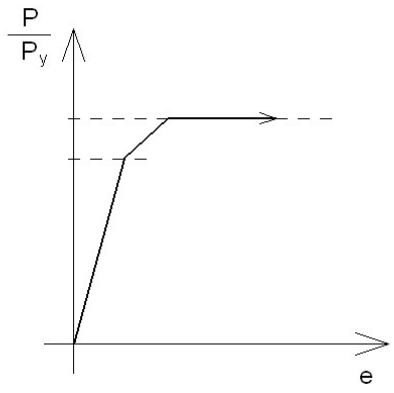
$$M_{pl,y} = W_{pl,y} \cdot f_y$$

$$\sum E = M_{pl}(2\theta + \theta) - P\left(\frac{L}{2}\theta\right) = 0$$

$$P_u = \frac{6}{L} M_{pl}$$

Kinematikai módszer:





$$\gamma_1 = \frac{M_{pl}}{M_y} \approx 1{,}15$$

$$\gamma = \frac{P_u}{P_y} = \frac{\frac{6}{L} M_{pl}}{\frac{64}{13L} M_y} = 1{,}22 \cdot 1{,}15 = 1{,}4$$