

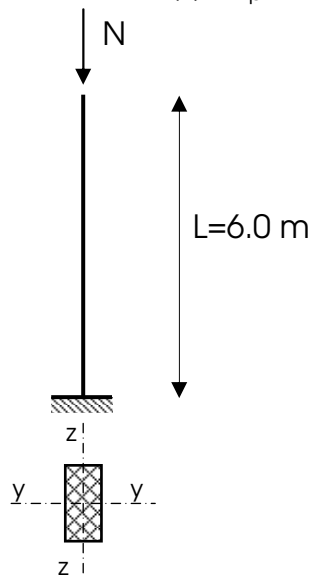
Module B

Stability of Steel Structures

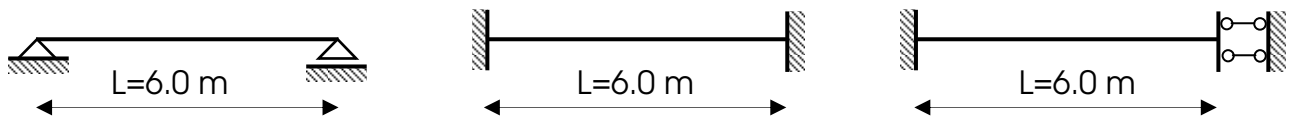
Week 1 – Topic: General principles on stability of beam-columns

Homework 1: The column represented in the following figure is made out of an elastic-material with $E=30$ GPa and $f_y=30$ MPa with a rectangular $30 \times 50 \text{ cm}^2$ cross section. Evaluate:

- the Euler critical load in both the principal directions;
- the maximum length value L such that $N_E(L) = N_{pl}$.



Finally, for the same beam-column, evaluate the Euler critical load in both the principal directions considering the three end restraint conditions represented below:



Homework 2: For all the above schemes, determine the values of non-dimensional slenderness in both the principal directions.

Homework 3: Let us consider the beam-column in HW1; let it loaded by an axial force $N=100$ kN and an horizontal force $F=20$ kN at its free end. Determine the sway displacement looking after the so-called second order effects.