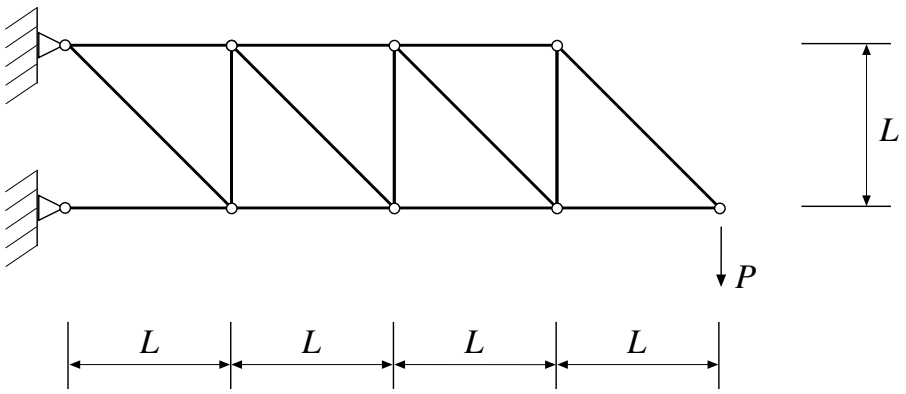
Hand-in assignment 1
(Konstruktionsuppgift 1)



The above truss is constructed of HEA100 bars ($A = 2124$ mm^2, $E = 2.1 \cdot 10^5$ MPa), L=1.5 m and $P = 20$ kN.

a) Calculate, using CALFEM, the displacement of the point of action of the load. Plot the truss in its undeformed and deformed positions.

b) Determine the size and location of the largest tensile and compressive stresses in the truss.

c) Calculate the horizontal and vertical reaction forces in the lower support.

d) Assume that the lower support can only take a horizontal load, that is, assume a roller support instead of a pinned one. Describe what will happen with the truss from a physical point of view and what happens when you try to solve the system of equations. Suggest a simple change in the truss that will make it work also for this kind of support.

The solution should consist of a first part where the problem is stated and the results are summarized, and a second part where the calculations are presented. The second part could be an m-file with comments and result values. Note that a figure showing the numbering of elements and degrees of freedom must be included.