## List 14

## Task 1

According to the dimensions shown in the figure below, a model of a three-hinge bracket with a thickness of 6 mm should be prepared. The bracket is used to transmit drive through pins located in the Ø12 holes and further mechanical connections. Assume that the component is made of structural steel (Young's modulus E = 200 GPa; Poisson's ratio v = 0,3). For the operating conditions scenario in which the motion of the analyzed three-hinge bracket is blocked by pins placed in holes A and B, and a force of  $F_1 = 7$  kN is applied at hole C (the direction of the force  $F_1$  is aligned with the positive y-axis), determine the total displacements and the reduced stresses according to the Hubervon Mises hypothesis.



Based on the analyzed operating conditions scenario, an optimization analysis of the three-hinge bracket should be carried out, assuming the following objective functions:

Objective 1: Minimize the mass of the component

Objective 2: Local stresses must not exceed 110 MPa