## Subject: Solid Mechanics Simulation



**Assignment:** The beam with dimensions 100x10x20 mm is fixed and loaded as is shown in firg.1. The beam has a 2 mm crack. The beam material is homogeneous linear elastic with Poisson's ratio v=0.27.

Determine the change of the stress intensity factor while the module of elasticity E varies within the borders of  $0.1 \div 210^{11}$  Pa.

## Submit:

- 1. Geometrical model, including the mesh and the boundary conditions.
- 2. The stress (von Mises) state for  $E= 0.8 \ 10^{11} \text{ Pa.}$ .
- 3. The strain state for  $E= 1.5 \ 10^{11}$  Pa.
- 4. The values of the stress intensity factor for  $E= 1.5 \ 10^{11} \text{ Pa}$ .
- 5. Drawing of the dependence between the stress intensity factor  $K_1$  and the module of elasticity.

## Answer the next questions:

- 1. What is the geometrical peculiarity of the object and where it is treated in the solution?
- 2. What is the mechanical behaviour peculiarity of the material when the crack exists and where it is treated in the solution?
- 3. What element type was used?
- 4. What element options were used?
- 5. What real constants were used?
- 6. How many nodes and elements were created?
- 7. What is the % error for your solution?