# Fatigue and fracture
Homework

The aim of the homework is to visualize and depict the margin of the plastic zone around the crack tip in 2D and 3D cases for the go through crack shown in the figure below. The plate is infinite and have a thickness of B. The proof strength and the Poisson coefficient of the material is $R_{p0.2}$ and 0.33 respectively, while the stress intensity of the configuration is K_I.
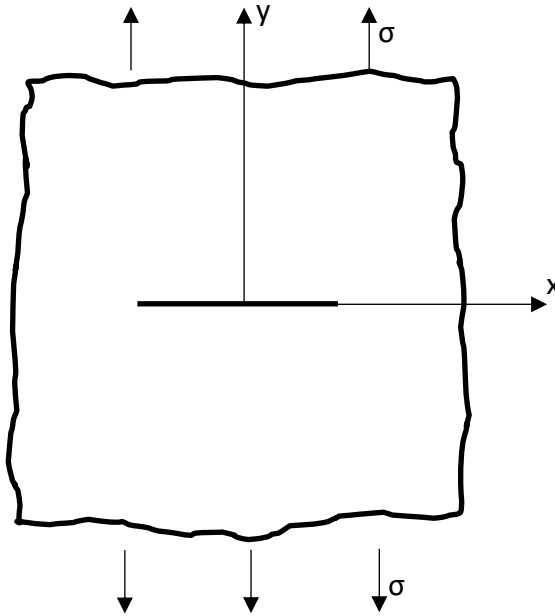
Proof strength	1	2	3
$R_{p0.2}$ (MPa)	600	800	1000

Stress intensity	1	2	3
K_I (Nmm$^{-3/2}$)	1000	1150	1300

Thickness	1	2	3
B (mm)	20	25	30

Subtasks
(i)   Calculate and visualize the contour line of the plastic zone in **plane strain** condition.
(ii)   Calculate and visualize the contour line of the plastic zone in **plane stress** condition.
(iii)   With a proper choice of distribution function of σ (along z axis) calculate and visualize the **3D contour surface of the plastic zone** along the plate thickness (pure plane stress on the surface and pure plain strain in the middle line of the plate).

The detailed, explained and commented documentation with descriptions, equations and plots, prepared by engineering fastidiousness should be sent via e-mail to **orbulov@eik.bme.hu** under the filename of **<Given name_First name_Neptun code.pdf>**.
Deadline: 6th December 2023. 12:00.