Take Home Exam03D1: Crack Tip Fracture Mechanics

## Assigned: 03/15/2022 (Tuesday)

## Due (as pdf by email) 03/18/2022 (Friday)

You may submit your answers in one of two ways:

(i) •For typed answers: as a .docx file (as is) or converted into a pdf file. (DO NOT SEND GOOGLE DOC)

•For handwritten answers: Please scan as images, and group together into one pdf file. Or you may hand them manually to my office (ECME-212)

(ii) Please send your submission via email starting with HWExam03D1 in the subject line.

03D1.1

In today's lecture the equation for the shear stress near the crack tip is given by



Make a plot of the above equation to find the angle where the shear stress is at a maximum (I find it to occur at 40o - please confirm).

You do not have to send me the plot: just the angle where you find the maximum to be.

03D1.2

Recall that plastic deformation is a shear phenomenon. Draw a schematic of the plastic zone shape in front of a crack tip under local yielding. Add one or two sentences to explain.