

AY 202 Assignment 1

due: Tuesday, February 1

Problem 1: In lecture we presented the concept of the stress tensor σ_{ik} . This has the property that f_i , the force per unit area acting in a direction i is given by

$$f_i = \sigma_{ij} \hat{n}_j ,$$

where \hat{n}_j is the normal (unit) vector in the j th-direction. Here, we are implicitly summing over all such directions.

Show that, regardless of its detailed form, the stress tensor must be symmetric:

$$\sigma_{ij} = \sigma_{ji} .$$

Hint: Consider the forces on a small box, and invoke angular momentum conservation.

Problem 2: Clarke & Carswell, Problem 3 (in back of book)

Problem 3: C & C, Problem 5

Problem 4: C & C, Problem 8