MT3271: EXAMPLE SHEET[1] VII

1.) An infinite homogeneous isotropic linearly elastic body contains a spherical cavity of radius a. The cavity is filled with gas of uniform pressure p_0 and there is no body force. Find the displacement everywhere in the solid. What is the fractional increase in the radius of the cavity due to the gas pressure?

2.) Consider the three-dimensional displacement field

$$u_i = \frac{\lambda + 2\mu}{\mu(\lambda+\mu)}\ \psi_{i,jj} - \frac{1}{\mu}\ \psi_{j,ji}.$$

Provided there are no body forces, what condition does the vector function ψ_i have to fulfill for this displacement field to be a solution of the Navier-Lamé equations?

Coursework

Please hand in the solution to questions 1 **and** 2 by Friday, November 17, 2000. Please place them into the file in Dr. Heil's pigeonhole in the general office on the 4th floor.

[1] Any feedback to: *M.Heil@maths.man.ac.uk*