

MT3271: EXAMPLE SHEET¹ 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 Wednesday (in 1 1/2 week's time). Please place them into the file in Dr. Heil's pigeonhole in the general office on the 4th floor.

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