

MATH35021: 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?

¹Any feedback to: Andrew.Hazel@manchester.ac.uk