

Problem 101C

Consider a planetary body of radius, R , which consists of a fluid of uniform density, ρ . The variation of pressure, p , within the spherical body is given by

$$\frac{\partial p}{\partial r} = -\rho g$$

where r is the radius of a point in the interior. If the acceleration due to gravity, g varies linearly with the radial location, r , and has a value of g_0 at the surface, find an expression for the pressure in the interior in terms of ρ , g_0 , r and R .