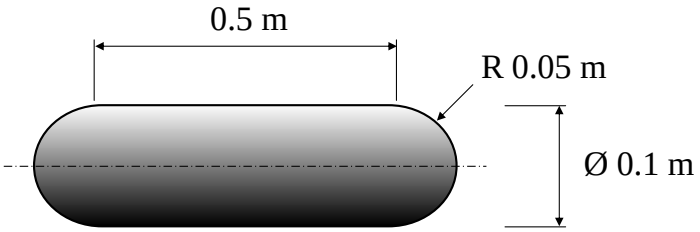
Example 2.1.3

The cylindrical pressure vessel with hemispherical caps shown in Figure 1 is made of stainless steel with E = 200 GPa and ν = 0.33. The wall thickness is 1 mm everywhere. Calculate the longitudinal and hoop strains in the central cylindrical portion (*i.e.* away from the caps) when the vessel is pressurised to 100 kPa.



Wall thickness t = 1 mm

Internal pressure p = 100 kPa

Figure 1: A pressure vessel (not to scale).