

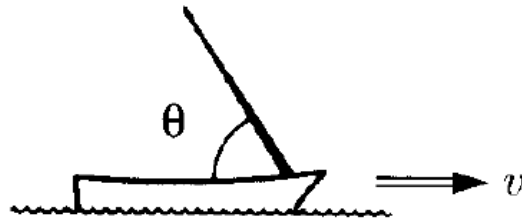
PHY103 Problem Set # 11 Date: October 18, 2016 [RCB/Krishnacharya]

1. In a laboratory experiment a muon is observed to travel 800m before disintegrating. A researcher looks up the lifetime of a muon (2×10^{-6} s) and concludes that its speed was

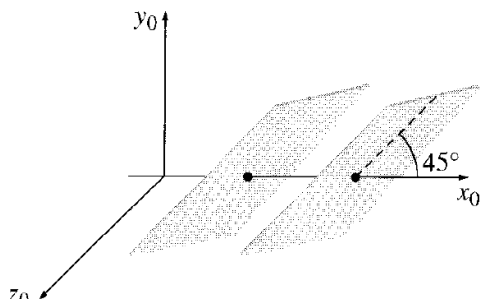
$$V = 800\text{m} / 2 \times 10^{-6}\text{s} = 4 \times 10^8 \text{ m/s.}$$

Faster than light ! Identify the researcher's error, and find the actual speed of the muon.

2. A sailboat is manufactured such that the mast leans at an angle θ with respect to the deck. An observer standing on a dock sees the boat go by at speed v . What angle does this observer say the mast makes?



3. A parallel plate capacitor, at rest in S_0 and tilted at 45° angle to the x_0 axis, carries charge density $\pm\sigma_0$ on the two plates. System S is moving to the right at speed v relative to S_0 .
 - (a) Find E_0 , the field in S_0
 - (b) Find E , the field in S
 - (c) What angle do the plates make with the x -axis?
 - (d) Is the field perpendicular to the plate in S ?



4. Please workout the example # 12.13 of Griffiths, 3rd Edition.

