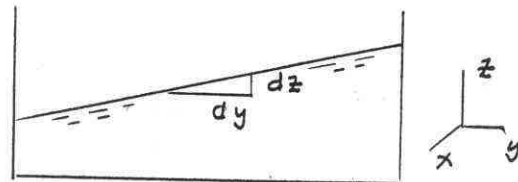


2.151

2.151 An open container of oil rests on the flatbed of a truck that is traveling along a horizontal road at 55 mi/hr. As the truck slows uniformly to a complete stop in 5 s, what will be the slope of the oil surface during the period of constant deceleration?

$$\text{slope} = \frac{dz}{dy} = - \frac{a_y}{g + a_z} \quad (\text{Eq. 2.28})$$



$$a_y = \frac{\text{final velocity} - \text{initial velocity}}{\text{time interval}}$$

$$= \frac{0 - (55 \text{ mph}) \left(0.4470 \frac{\text{m}}{\text{s}} \frac{1}{\text{mph}} \right)}{5 \text{ s}} = -4.92 \frac{\text{m}}{\text{s}^2}$$

Thus,

$$\frac{dz}{dy} = - \frac{(-4.92 \frac{\text{m}}{\text{s}^2})}{9.81 \frac{\text{m}}{\text{s}^2} + 0} = \underline{\underline{0.502}}$$