Assignment 1

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Download all latex codes from

https://github.com/sujal100/EE3900/tree/main/Assignment1.tex

1 Problem

(Vectors 2.17c) Give the magnitude and direction of the net force acting on a stone of mass 0.1 kg, lying on the floor of a train which is accelerating with $1ms^{-2}$, the stone being at rest relative to the train. Neglect air resistance throughout.

2 Solution

Let the train move in $\hat{i}$ direction with acceleration $(a) = 1ms^{-2}$.
F is the force due to acceleration of train.

$$a = 1\hat{i} \tag{2.0.1}$$

$$F = ma \tag{2.0.2}$$

$$= 0.1\hat{i} \tag{2.0.3}$$

Note that the weight of the stone is being balanced by the normal reaction (as stone being at rest relative to the train). The magnitude of the net force is 0.1 N and it acts along direction of motion of the train.