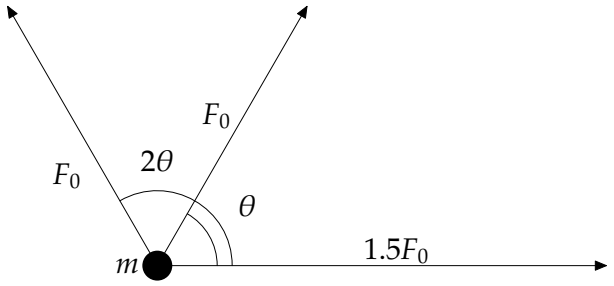
PHY 9A Discussion 3, Spring 2018

1. Forces on a Massive Object

Three forces are exerted on a rest massive object on a flat leveled plane; two of them have the same magnitude, F_0, and the third one has the magnitude 1.5 times as large as the others; one of the two forces with the same magnitude has an angle twice as large as the other one's angle, θ, measured from the direction of the largest force.



i. Is it possible to have zero net force? If yes, then find θ which gives zero net force; if no, then find θ at which the magnitude of the net force is minimized.

ii. When $\theta = 30°$, and $F_0 = 12$ [N], you observed object's acceleration as 27 [m/s^2]. What is the mass of the object? What is the direction of the acceleration?

2. Changing the Direction by Force

A point mass of $m = 3$ [kg] is currently moving on a frictionless ground into the positive x-direction with constant speed $v_0 = 7$ [m/s]. In an x-interval of 2 [m] lies ahead, there will be a chance to apply constant force (over the interval) on the mass to change its direction so that it will be launched with an angle of 45° to the ground after passing the interval.

i. If the force can only be in the y-direction, what should the magnitude of the force be? (Don't forget gravity!)

ii. Find the direction and the magnitude of the force when you want the launching speed to be the same as the traveling speed.