The report and documentation of the 'Classical mechanics'

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1. Acceleration

The acceleration calculator is sorted as 1)speed difference, 2) mass and force, 3) and distance traveled depended on the given circumstances, which equations require different elements to extract and calculate the acceleration.

1) Speed difference.

To begin with, this equation requires the 'initial speed', 'final speed', and 'time' as the elements to calculate the acceleration. This equation basically originated from the equation :

(1) The velocity

v2 =v1 + at [m/s]

(v1 : the initial speed, v2 : the final speed, a : acceleration, t : time interval)

then, the acceleration equation is

a = (v2 - v1) / t [m/s2]

In this equation(speed difference), the v1 and v2 are the vector(velocity), not merely literally speed values because the situation of the object's moving is presupposed as 1-dimension condition, but those values have positive and negative directions. This means that the moving object not only has magnitude of vector, but also has the direction. (never confuse that even though the object which has moving in 1-dimension circumstance can has vector values, not only scalar values). Moreover, both of speed values can be in the 2-dimension and 3-dimension circumstance.

2) Mass and force

First of all, the equation of force is made by the multipulation mass with acceleration

(2) The force

F = ma [N]

(m : the mass of the object, a : the acceleration of the object)

([N] is unit of force, also can be declared [kg x m / s2])

Therefore, the acceleration in this equation when the force and mass are given, the acceleration is

a = F / m [m/s2]

3) Distance traveled

In this equation, the essential requiste elements to extract the acceleration of the moving object are initial speed, distance, and time interval. The element of distance is the total distance which the object had traveled from initial point to terminal point. In this equation of acceleration when those elements are given as initial values, the acceleration value can be calculated with following equation :

(3) Later point

x = x0 + v0t + 0.5at2

(x0 : initial point where the object has first time, v0 : initial velocity which the object has at initial time, t : time interval which the object had moved)

If the values of initial velocity and initial point have 0, the total distance the object had moved is merely depending on the acceleration and time interval, which means that if the circumstance which we presuppose the initial point as (0, 0) in 2-dimension grid and the object is stopped, the location the object has is relied on acceleration and time.

The acceleration cna be calculated if all of those elements are given.

(if x0 = 0), x - v0t = 0.5at2

a = 2(x - v­0t) / t2

These three equations are included in one combobox which is one of functions 'Tkinter' has. The main function include 3 subsidiary functions('Speed difference', 'Mass and force', and 'Distance traveled') and when the users select the element what they want to utilize to calculate the acceleration with given values the event is run. For this process, the main function has to have 'event' value. For example,

def equation(event):

...code...

Then, when all of codes are written, this combobox has to be binded with 'bind' method. Like this :

combobox.bind('<<ComboboxSelected>>', function)

The combobox can be imported from tkinter.ttk. In short, the usage of combobox with selecting event has to have following codes

from tkinter import ttk

def equation(event):

c = combobox.get()

...code...

combobox = tkinter.ttk.Combobox(frame)

combobox.pack()

combobox.bind('<<ComboboxSelected>>', equation)