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# -*- coding: utf-8 -*-
"""
cap 1
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"""
from bokeh.plotting import figure, show
from bokeh.models import BoxAnnotation
from math import sin,cos,radians,pi
import numpy as np

X1=[]
X2=[]
I=[]
for i in range(0,370,10):
    alfa=i*pi/180
    x1=sin(alfa)
    print(x1)
    X1.append(x1)
    print(X1)
    x2=cos(alfa)
    X2.append(x2)
    I.append(i)

print('sen(x= )',X1)
print()
print('cos(x)= ',X2)
print()

p = figure(x_axis_label="Angolo (gradi)",
          y_axis_label="Velocità e spostamento",
          background_fill_color='gray',
          background_fill_alpha=0.1,
          border_fill_color='green',
          border_fill_alpha=0.25,)
p.title.text = "Oscillatore armonico non smorzato"
p.title.align = "center"

p.legend.border_line_width = 3
p.legend.border_line_color = "navy"
p.legend.border_line_alpha = 0.8
p.legend.background_fill_color = "#F0E442"
p.legend.background_fill_alpha = 0.2
p.line(I, X1, legend_label="velocità", color="blue", line_width=2)
p.line(I, X2, legend_label="spostamento", color="red", line_width=2)
p.legend.location = "top_center"
show(p)

```