In [2]:

```
import numpy as np
import matplotlib.pyplot as plt

g = 9.81 # m/s^2
k_values = np.array([0.08, 0.04, 0.02, 0.01, 0.005])
t = np.linspace(0, 400, 2000) # time
v = 1000 # m/s (initial velocity)
theta = np.sqrt(1)/2 # angle from horizontal
U = v * np.cos(theta) # initial x velocity
V = v * np.sin(theta) # initial y velocity

plt.figure(figsize=(10, 10))

for k in k_values:
    x = (U/k) * (1 - np.exp(-k * t)) # x w/ drag
    y = -(g/k)*t + ((k*V + g)/(k**2))*(1 - np.exp(-k*t)) # y w/ drag
    xf = x[y>=0]
    yf = y[y>=0]
    plt.plot(xf, yf, label=f'k = {k}')

x_0 = v*t*np.cos(theta) # x w/o drag
y_0 = -(g/2)*t**2 + v*t*np.sin(theta) # y w/o drag
x_0f = x_0[y_0>=0]
y_0f = y_0[y_0>=0]
plt.plot(x_0f, y_0f, label=f'k = {0}', linestyle='--')

plt.title('Figure 2-8 (page 66)')
plt.xlabel('x (m)')
plt.ylabel('y (m)')
plt.legend()
plt.grid(True)
plt.show()
```

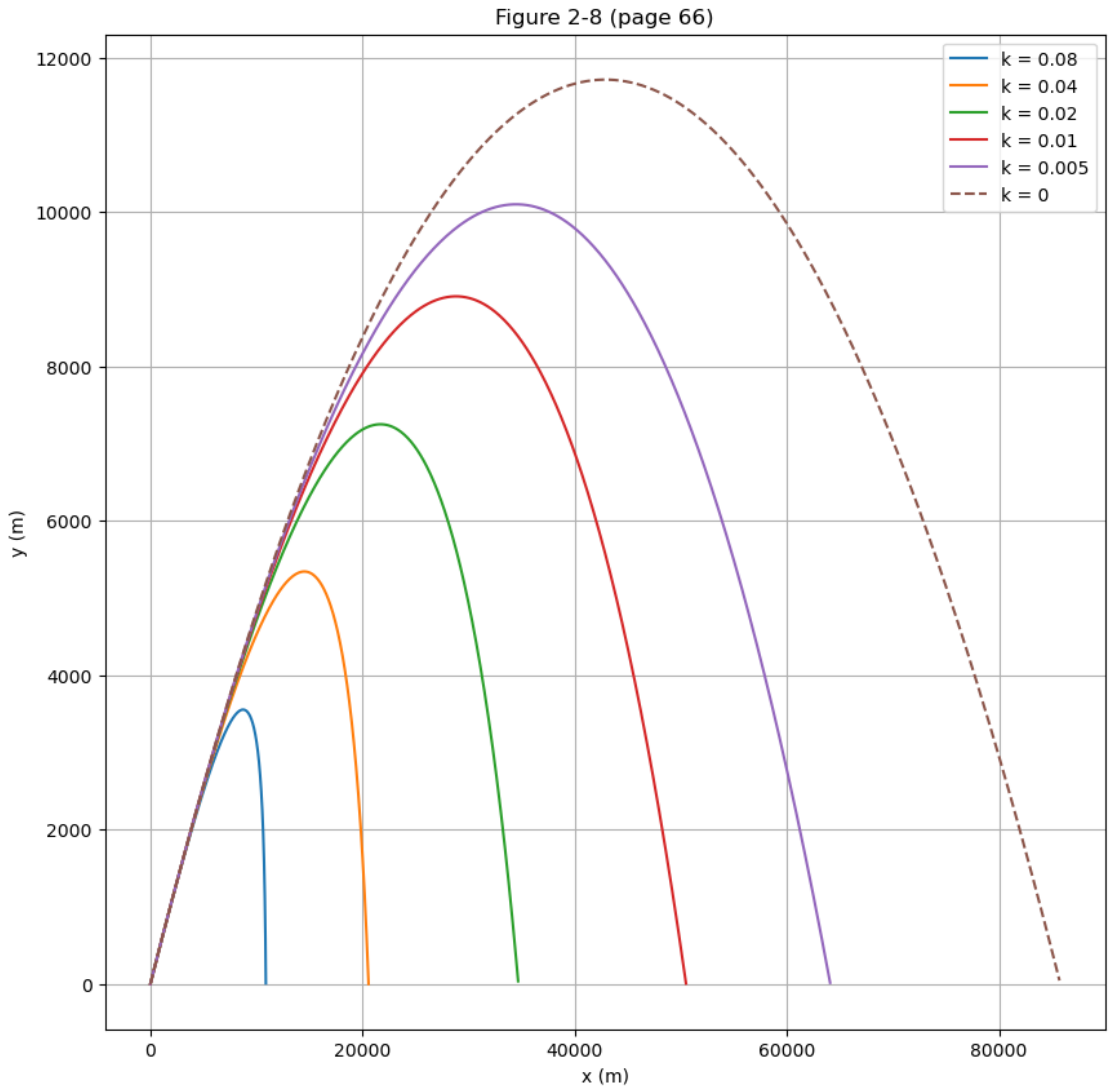
Figure 2-8 (page 66)
k = 0.08
k = 0.04
k = 0.02
k = 0.01
k = 0.005
k = 0
12000
10000
8000
6000
4000
2000
0
y (m)
0
20000
40000
60000
80000
x (m)

In [ ]: