

## Copilot

Sure, the second-order differential equation form of the motion equation with a speed-dependent drag force is:

$$m \frac{d^2}{dt^2} x(t) = mg - k \left| \frac{dx(t)}{dt} \right| \frac{dx(t)}{dt}$$

where:

- $m$  is the mass of the projectile,
- $x(t)$  is its position as a function of time,
- $g$  is the acceleration due to gravity,
- $k$  is a drag coefficient,
- $\left| \frac{dx(t)}{dt} \right|$  is the magnitude of the velocity.

The drag force is proportional to the square of the speed, which makes the problem non-linear. This equation can be solved numerically using methods like the Runge-Kutta method.

Please note that this is a simplified model and actual projectile motion can be more complex due to factors like wind, spin, and variable air density. Also, the step size  $h$  may need to be adjusted based on the specifics of the problem to ensure the accuracy of the solution.