

Algorithm I . Simulasi gerak bola bekel dengan hambatan udara (Kel 1B)

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1: Baca input:  
    v0, launch_angle (derajat), initial_height, k, mass, g, Δt, t_max  
2:   θ ← radians(launch_angle)  
3:   vx0 ← v0 * cos(θ)  
4:   vy0 ← v0 * sin(θ)  
5:   t ← 0; x ← 0; y ← initial_height; vx ← vx0; vy ← vy0  
6:   times ← [t]; x_vals ← [x]; y_vals ← [y]  
7: Function accel(state):  
8:   (x,y,vx,vy) ← state  
9:   v ← sqrt(vx2 + vy2)  
10:  Fx ← -k * v * vx  
11:  Fy ← -k * v * vy  
12:  ax ← Fx/mass  
13:  ay ← (Fy - mass * g)/mass  
14:  return [vx, vy, a_x, a_y]  
15: Function (state, t, Δt):  
16:   k1 ← accel(state)  
17:   k2 ← accel(state + 0.5 * Δt * k1)  
18:   k3 ← accel(state + 0.5 * Δt * k2)  
19:   k4 ← accel(state + Δt * k3)  
20:   state_new ← state + (Δt/6) * (k1 + 2 * k2 + 2 * k3 + k4)  
21:   return state_new  
22: while t ≤ t_max and y ≥ 0 do  
23:   state ← [x,y,vx,vy]  
24:   state ← RK4_step(state, t, Δt)  
25:   (x,y,vx,vy) ← state  
26:   t ← t + Δt  
27:   append times ← t; append x_vals ← x; append y_vals ← y  
28: end while  
29: flight_time ← times[-1]  
30: Tampilkan plot(x_vals, y_vals) dengan label sumbu dan judul  
31: Tampilkan plot(times, y_vals) dengan label sumbu dan judul  
32: Cetak : "Waktu di Udara =", waktu_terbang, "detik"
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