

Free Fall With Air Resistance

Falling mass subject to gravity and air resistance

Air resistance $f = bv^2$, where b = drag coefficient

Initial Parameters

to be set by user

delta_t =	0.002	time increment (s)
g =	9.8	gravity (m/s ²)
m =	1	mass (kg)
b =	5	drag coefficient
v_i =	-3	initial velocity (m/s)

Acceleration: $a = g \pm f/m = g \pm (b/m)v^2$

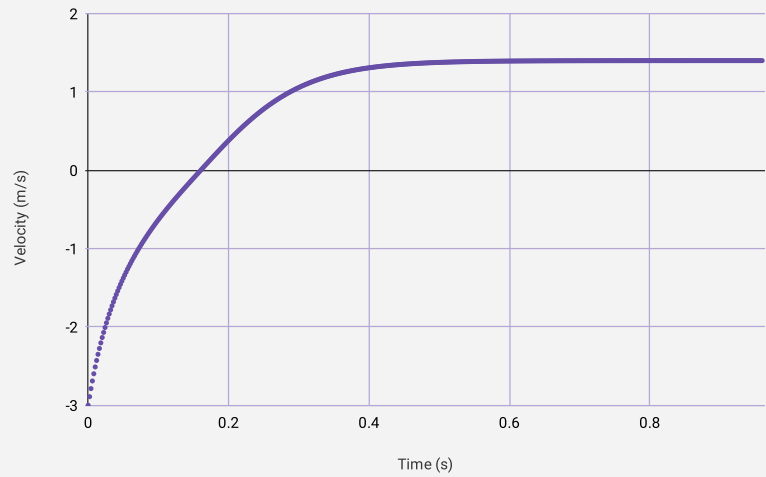
Velocity: $v_2 = v_1 + a\Delta t = v_1 + (g \pm (b/m)(v_1)^2)\Delta t$

Displacement: $y_2 = y_1 + [(v_2 + v_1)/2]\Delta t$

Calculate assuming DOWN is the (+) direction

Time (s)	Velocity (m/s)	Displacement (m)
0	-3	0
0.002	-2.8904	-0.0059
0.004	-2.7873	-0.0116
0.006	-2.6900	-0.0170
0.008	-2.5980	-0.0223
0.010	-2.5109	-0.0274
0.012	-2.4283	-0.0324
0.014	-2.3497	-0.0372
0.016	-2.2749	-0.0418
0.018	-2.2035	-0.0463
0.020	-2.1354	-0.0506
0.022	-2.0702	-0.0548
0.024	-2.0077	-0.0589
0.026	-1.9478	-0.0628
0.028	-1.8903	-0.0667
0.030	-1.8349	-0.0704
0.032	-1.7817	-0.0740
0.034	-1.7303	-0.0775
0.036	-1.6808	-0.0809
0.038	-1.6329	-0.0843
0.040	-1.5867	-0.0875
0.042	-1.5419	-0.0906
0.044	-1.4985	-0.0936
0.046	-1.4565	-0.0966
0.048	-1.4157	-0.0995
0.050	-1.3760	-0.1023
0.052	-1.3375	-0.1050
0.054	-1.3000	-0.1076
0.056	-1.2635	-0.1102
0.058	-1.2279	-0.1127
0.060	-1.1933	-0.1151
0.062	-1.1594	-0.1174
0.064	-1.1264	-0.1197
0.066	-1.0941	-0.1220
0.068	-1.0625	-0.1241
0.070	-1.0316	-0.1262
0.072	-1.0014	-0.1282
0.074	-0.9718	-0.1302
0.076	-0.9427	-0.1321
0.078	-0.9142	-0.1340
0.080	-0.8863	-0.1358
0.082	-0.8588	-0.1375
0.084	-0.8318	-0.1392
0.086	-0.8053	-0.1409

Velocity (m/s) vs. Time (s)



Displacement (m) vs Time (s)

