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$$m = 500 \text{ kg}$$

$$V = 0.5 \text{ m}^3$$

$$\rho = 1000 \text{ kg/m}^3$$

$$m = \rho V = 1000 \times 0.5 = 500 \text{ kg}$$

$$F_g = mg = 500 \times 9.81 = 4905 \text{ N}$$

$$F_b = \rho V g = 1000 \times 0.5 \times 9.81 = 4905 \text{ N}$$

$$F_{net} = F_g - F_b = 4905 - 4905 = 0 \text{ N}$$

$$m \frac{dv}{dt} = F_g - F_b - F_d$$

$$m \frac{dv}{dt} = 4905 - 4905 - 0.0025 v^2$$

$$m \frac{dv}{dt} = -0.0025 v^2$$

$$\frac{dv}{v^2} = -\frac{0.0025}{m} dt$$

$$\int \frac{dv}{v^2} = -\frac{0.0025}{m} \int dt$$

$$-\frac{1}{v} = -\frac{0.0025}{m} t + C$$

$$\frac{1}{v} = \frac{0.0025}{m} t + C$$

$$v = \frac{m}{0.0025 t + C}$$

```

1 - commandwindow
2 - clear
3 - clc
4 - m=[0:1:500];
5 - k=[];
6 - for i=m
7 -     if(mod(i,2)==0)
8 -         k=[k Y(i)];
9 -     else
10 -        k=[k Ym(i)];
11 -    end
12 - end
13 - plot(m,k)
14 - k=k';
15 - m=m';
16 - a=[m k];
17 - grid on
18 - grid minor

```

```

16 - a=[m k];
17 - grid on
18 - grid minor
19 - xlabel("Time(min)")
20 - ylabel("volume (litres)")
21 - title("Dynamic model")
22 - mdata1='odevbesdata.xlsx';
23 - mdata2='veriler';
24 - xlswrite(mdata1,'t (min)',mdata2,'A1')
25 - xlswrite(mdata1,'v (litre)',mdata2,'B1')
26 - xlswrite(mdata1,A,mdata2,'A1')
27 - function Y0=Y(t)
28 -     Y0=50/0.05 + (50/1.0025)*sin(t) + 50*(0.05*cos(t))/1.0025
29 - end
30 - function Ym=Ym(t)
31 -     Ym=1000-800*exp(-0.05*t);
32 - end
33
34
35

```

Command Window

2

43200000 t - 43128000 cos(t) + 2158800 sin(t) - 36000 t^2 cos(t)

