```matlab
%=========Solution to Sim02Q1=========%

%----------Q1a----------%

% define f(t,y) = y^2-2y
f = @(t,y) (y.^2-2.*y);

% define t-values and y-values at which to sketch slope
tval = 0:0.1:4;
yval = -4:0.25:4;

% sketch the slopefield for dy/dt = y^2-2y
slopefield(f,tval,yval)

%----------Q1b----------%

% initial value for solution
y0 = -4;

% domain for solution
tspan = [0 4];

% solve dy/dt = y^2-2y with y(0) = -4
[t,y] = ode45(f, tspan,y0);

% plot solution on slopefield
hold on
plot(t,y,Linewidth=1)
hold off
```
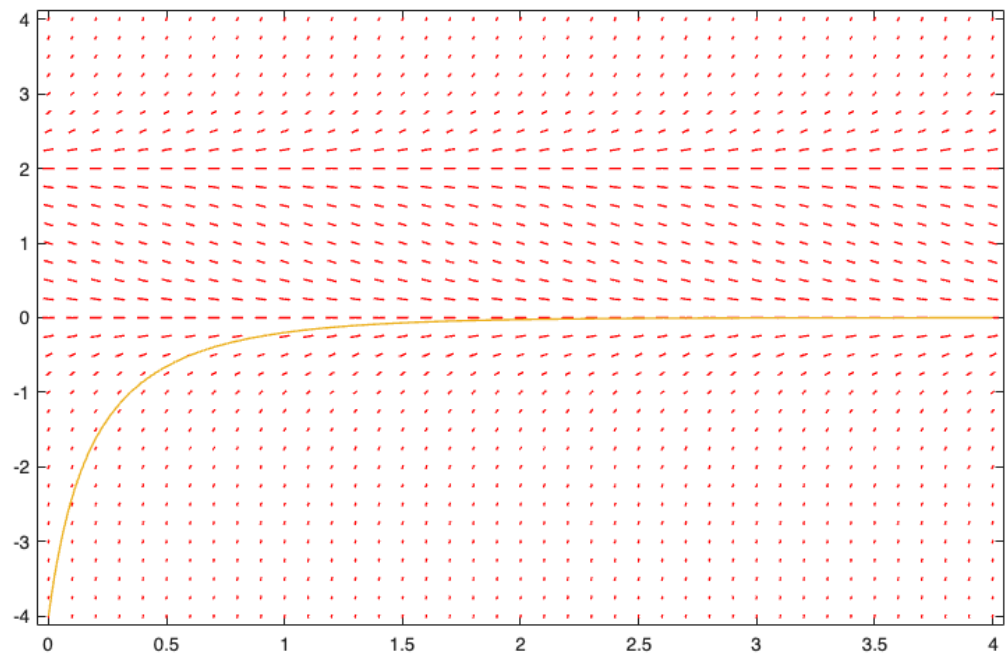
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```matlab
%==========Solution to Sim02Q2==========%

% define f(t,y) = 4y-y^3
f = @(t,y) (4.*y-y.^3);

% domain for solution
tspan = [0 4];

% plot solutions
for y0 = [0.1 -0.2 0 -2.5 -1 3]
    [t,y] = ode45(f, tspan,y0); % solve differential equation
    hold on
    plot(t,y,Linewidth=1) % plot result
end
hold off
```
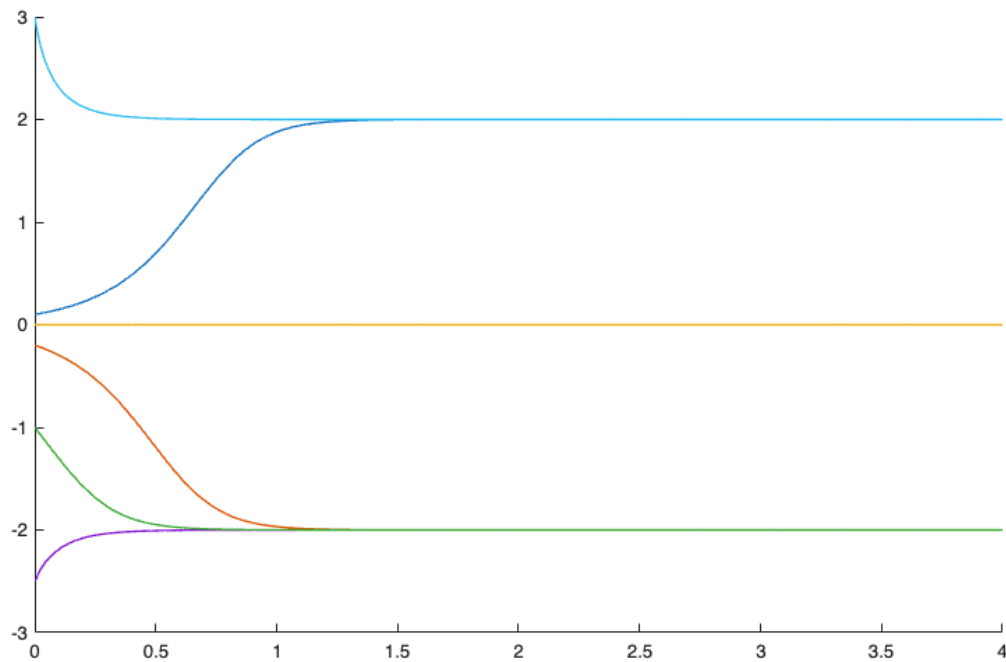

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