```
function [error] = Problem5_8_a(tol, figDisp, solver)

% odesample.m
% Sample code for solving a system of ODEs in matlab.
% Solves  v'' = v^2 + (v')^2 - v -1  with v(0)=1, v'(0)=0
% with true solution v(t) = cos(t).
% Rewritten as a first order system.
% From  http://www.amath.washington.edu/~rjl/fdmbook/chapter5  (2007)


global fcnevals

t0 = 0;                         % initial time
u0 = [-3; -2; 2];    % initial data for u(t) as a vector
tfinal = 2;                     % final time
fcnevals = 0;                   % counter for number of function
 evaluations

% solve ode:
options = odeset('AbsTol',tol,'RelTol',tol);
if(solver == 'ode113')
    odesolution = ode113(@f,[t0 tfinal],u0,options);
else %ODE45 default
    odesolution = ode45(@f,[t0 tfinal],u0,options);
end

% plot v = u(1) as a function of t:

figure('Visible', figDisp)
subplot(2, 1, 1)
t = linspace(0, tfinal, 500);
u = deval(odesolution, t);
v = u(1,:);
plot(t,v)
title('v(t) computed with ODE113')

% compare to true solution:
vtrue = -sin(2*t)+t.^2-3;
%hold on
subplot(2, 1 , 2)
plot(t,vtrue,'r')
title('actual solution for v(t)')
%hold off

error = max(abs(v-vtrue));
end


%---------------------------------

function f = f(t,u)
global fcnevals
```

```
f1 = u(2);
f2 = u(3);
f3 = -u(3)-4*u(2)-4*u(1)+4*t^2+8*t-10;
f = [f1; f2; f3];

fcnevals = fcnevals + 1;
end
```

```
Not enough input arguments.

Error in Problem5_8_a (line 20)
options = odeset('AbsTol',tol,'RelTol',tol);
```

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