CHEN 3600 Computer-Aided Chemical Engineering  
Department of Chemical Engineering

Auburn University, AL 36849

**MEMORANDUM**

**Date:** January 23, 2012

**To:** Dr. Tim Placek, Undergraduate Program Chair

**From:** Tim Placek ***tdp*Subject:** Solution for HW2 (Concerning Lab2)

The following code (script) was used for both the initial determination of the solution to the Lab 2 assignment as well as to prepare the plot data.

% where x(1) = w

% x(2) = H1

% x(3) = H2

% x(4) = a

% x(5) = b

clc

clear

global L1 L2 h

L1 = 12;

L2 = 10;

h = 3;

% starting values

xg(1)=min([L1,L2])/2;

xg(2)=L1/2;

xg(3)=L2/2;

xg(4)=xg(1)/2;

xg(5)=xg(1)/2;

soln = fsolve('placetd\_hw2\_lab2solver',xg);

disp('w = ')

disp(soln(1))

% now preparing plot

% these are just used to establish reasonable starting values

steps = 11;

ladder = linspace(10,15,steps);

for k = 1 : steps

L1 = ladder(k);

xg(1)=min([L1,L2])/2;

xg(2)=L1/2;

xg(3)=L2/2;

xg(4)=xg(1)/2;

xg(5)=xg(1)/2;

soln = fsolve('placetd\_hw2\_lab2solver',xg);

disp('w = ')

disp(soln(1))

% save values for plotting

xplot(k)=L1;

yplot(k)=soln(1);

end

plot(xplot,yplot)

xlabel('Length L1 (ft)')

ylabel('Alley width w (ft)')

title('placetd\\_hw2\\_SOLN')

The following code was employed in the function file which contained the equations to be solved:

function [f] = placetd\_hw2\_lab2solver(x)

% This is the system of equations to be solved in Lab2 - Spring 2012

% The method employed will be fsolve

% where x(1) = w

% x(2) = H1

% x(3) = H2

% x(4) = a

% x(5) = b

%

global L1 L2 h

f(1) = x(1)^2+x(2)^2-L1^2;

f(2) = x(2)/x(1)-h/x(5);

f(3) = x(1)-x(4)-x(5);

f(4) = x(3)/x(1)-h/x(4);

f(5) = x(1)^2+x(3)^2-L2^2;

end

The solution for L1 = 12 feet was found to be 8.8023.

The requested graph was prepared using an interval of 0.5 feet over the interval 10 to 15 feet.

