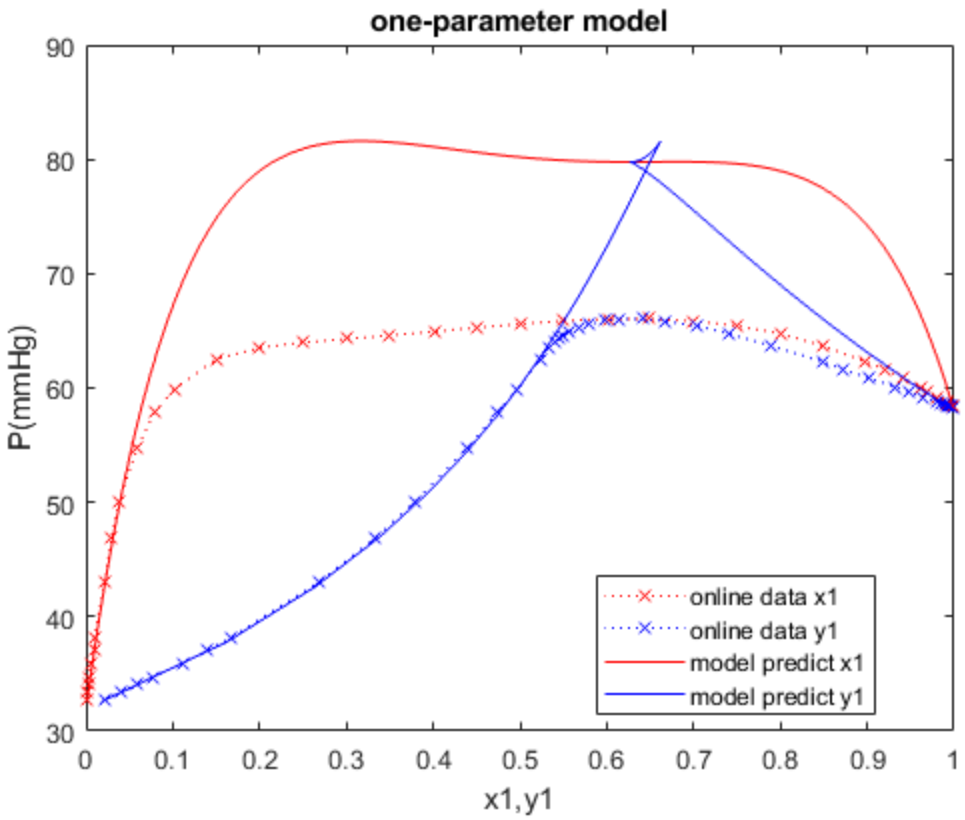
```
dat2 = load("C:\Users\buing\Documents\MATLAB\CBE 562\isopropanol(1)-
water(2).dat")
dat2_rand_2 = dat2(4:40,2) + (- 0.002 +
 (0.004).*rand(length(dat2(4:40,2)),1));
dat2_rand_3 = dat2(2:38,3) + (- 0.002 +
 (0.004).*rand(length(dat2(2:38,3)),1)) ;
dat2_rand = dat2;
dat2_rand(4:40,2) = dat2_rand_2;
dat2_rand(2:38,3) = dat2_rand_3;
dat = dat2_rand;
Psat1 = 58;
Psat2 = 32.01;
x1 = dat(:,2);
y1 = dat(:,3);
x2 = 1.- dat(:,2);
opt = optimoptions('fmincon','Display','off','Algorithm','sqp');
P_1 = dat(:,1).*750;
%need to set equality of P = x1*exp(A12(x2)^2)*Psat1 +
 x2*exp(A12(x1)^2)*Psat2
%g1 = exp(A12x2^2)
% exp(A12x2^2)x1Psat1/y1 = P
% => exp(A12x2^2) = y1P/x1Psat1
%A12x2^2 = log(y1P/x1Psat1) = Beq
%
Aeq = x2.^2;
Beq = log(y1.*P_1./(x1.*Psat1));
theta= fmincon(@func,2,[],[],Aeq,Beq,[],[],[],opt);
A12 = (theta);
%theta_est = A12
%back calculate g1 and g2
x1_pre = linspace(0.001,0.999,100);
x2_pre = 1.- x1_pre;
g1_pre = exp(A12*(x2_pre.^2));
g2_pre = exp(A12*(x1_pre.^2));
P1_pre = Psat1.*x1_pre.*g1_pre + Psat2.*x2_pre.*g2_pre;
y1_pre = g1_pre.*x1_pre.*Psat1./P1_pre;
%output
plot(x1,P_1,':xr')
hold on
plot(y1,P_1,':xb')
plot(x1_pre,P1_pre,'-r')
plot(y1_pre,P1_pre,'-b')
title('one-parameter model')
legend('online data x1','online data y1','model predict x1', 'model
 predict y1','location','best')
ylabel('P(mmHg)')
xlabel('x1,y1')

function LogL1 = func(theta)
global x2 x1
LogL1 = [(theta*sum(x2.^2))];
end
```

```
dat2 =

    0.0437    0.0010    0.0213
    0.0437    0.0010    0.0213
    0.0446    0.0020    0.0413
    0.0454    0.0030    0.0601
    0.0463    0.0040    0.0778
    0.0479    0.0060    0.1105
    0.0494    0.0080    0.1398
    0.0509    0.0100    0.1662
    0.0573    0.0200    0.2667
    0.0626    0.0300    0.3331
    0.0668    0.0400    0.3797
    0.0730    0.0600    0.4393
    0.0771    0.0800    0.4744
    0.0799    0.1000    0.4964
    0.0834    0.1500    0.5240
    0.0847    0.2000    0.5350
    0.0853    0.2500    0.5406
    0.0857    0.3000    0.5451
    0.0861    0.3500    0.5504
    0.0866    0.4000    0.5576
    0.0870    0.4500    0.5673
    0.0875    0.5000    0.5799
    0.0878    0.5500    0.5958
    0.0880    0.6000    0.6154
    0.0881    0.6500    0.6391
    0.0878    0.7000    0.6676
    0.0872    0.7500    0.7015
    0.0863    0.8000    0.7419
    0.0849    0.8500    0.7899
    0.0831    0.9000    0.8473
    0.0822    0.9200    0.8733
    0.0812    0.9400    0.9014
    0.0801    0.9600    0.9317
    0.0795    0.9700    0.9478
    0.0789    0.9800    0.9645
    0.0783    0.9900    0.9819
    0.0782    0.9920    0.9854
    0.0781    0.9940    0.9890
    0.0779    0.9960    0.9927
    0.0779    0.9970    0.9945
    0.0778    0.9980    0.9963
    0.0777    0.9990    0.9982
```



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