HW 8.3

a)

mx0=2;

my0=2;

mx1=-2;

my1=-2;

sx=2;

sy=1;

rxy=0;

a=(2\*(mx0-mx1))/(sx)^2+(2\*rxy\*(my1-my0))/sx\*sy;

b=(2\*(my0-my1))/(sy)^2+(2\*rxy\*(mx1-mx0))/sx\*sy;

c=((mx1)^2-(mx0)^2)/(sx)^2+(2\*rxy\*(mx0\*my0-mx1\*my1))/sx\*sy+((my1)^2-(my0)^2)/(sy)^2;

x=-10:0.1:10;

y=-(a\*x+c)/b;

plot(parta\_H0\_data(:,1),parta\_H0\_data(:,2),'o',parta\_H1\_data(:,1),parta\_H1\_data(:,2),'+',x,y)

xlabel('x')

ylabel('y')

legend('H0','H1')

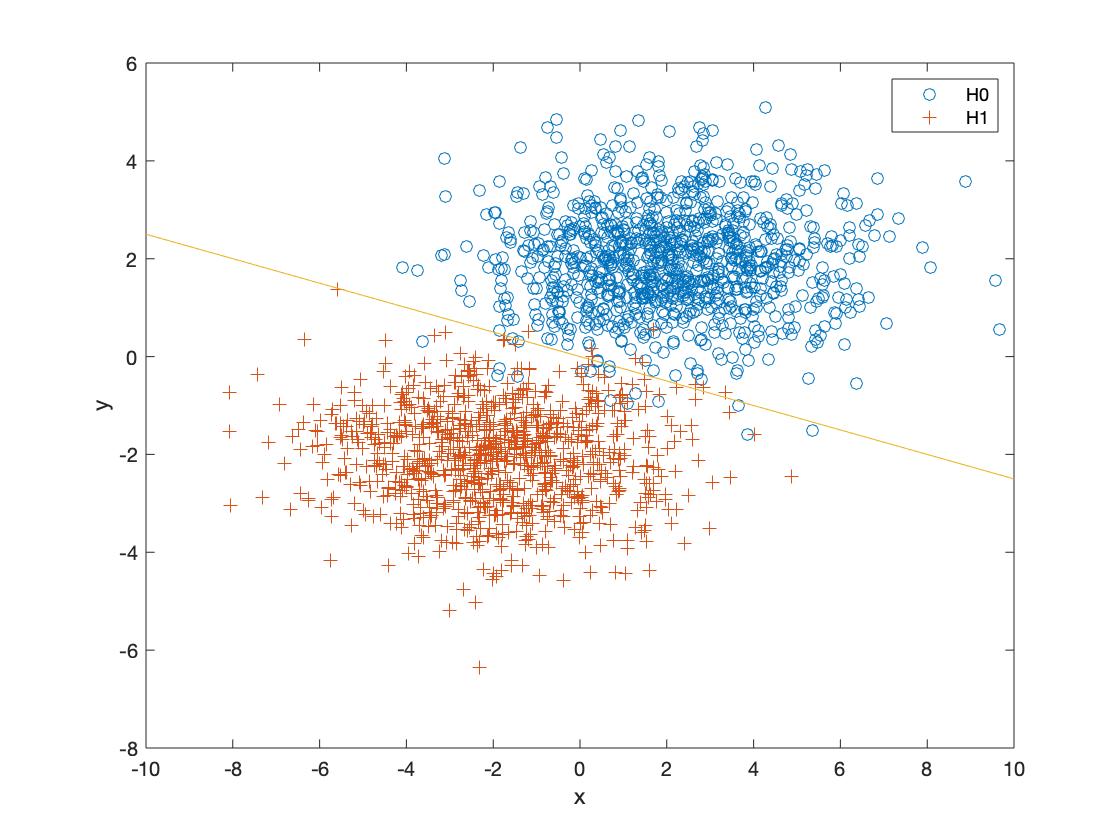
H0\_decision=(a\*parta\_H0\_data(:,1)+b\*parta\_H0\_data(:,2)+c)>0;

missH0=length(H0\_decision)-sum(H0\_decision);

H1\_decision=(a\*parta\_H1\_data(:,1)+b\*parta\_H1\_data(:,2)+c)>0;

missH1=sum(H1\_decision);

fracmiss=(missH1+missH0)/2000



fracmiss =

0.0130

b)

mx0=1;

my0=1;

mx1=3;

my1=-1;

sx=sqrt(3/2);

sy=sqrt(2);

rxy=1/sqrt(3);

a=(2\*(mx0-mx1))/(sx)^2+(2\*rxy\*(my1-my0))/sx\*sy;

b=(2\*(my0-my1))/(sy)^2+(2\*rxy\*(mx1-mx0))/sx\*sy;

c=((mx1)^2-(mx0)^2)/(sx)^2+(2\*rxy\*(mx0\*my0-mx1\*my1))/sx\*sy+((my1)^2-(my0)^2)/(sy)^2;

x=-10:0.1:10;

y=-(a\*x+c)/b;

plot(partb\_H0\_data(:,1),partb\_H0\_data(:,2),'o',partb\_H1\_data(:,1),partb\_H1\_data(:,2),'+',x,y)

xlabel('x')

ylabel('y')

legend('H0','H1')

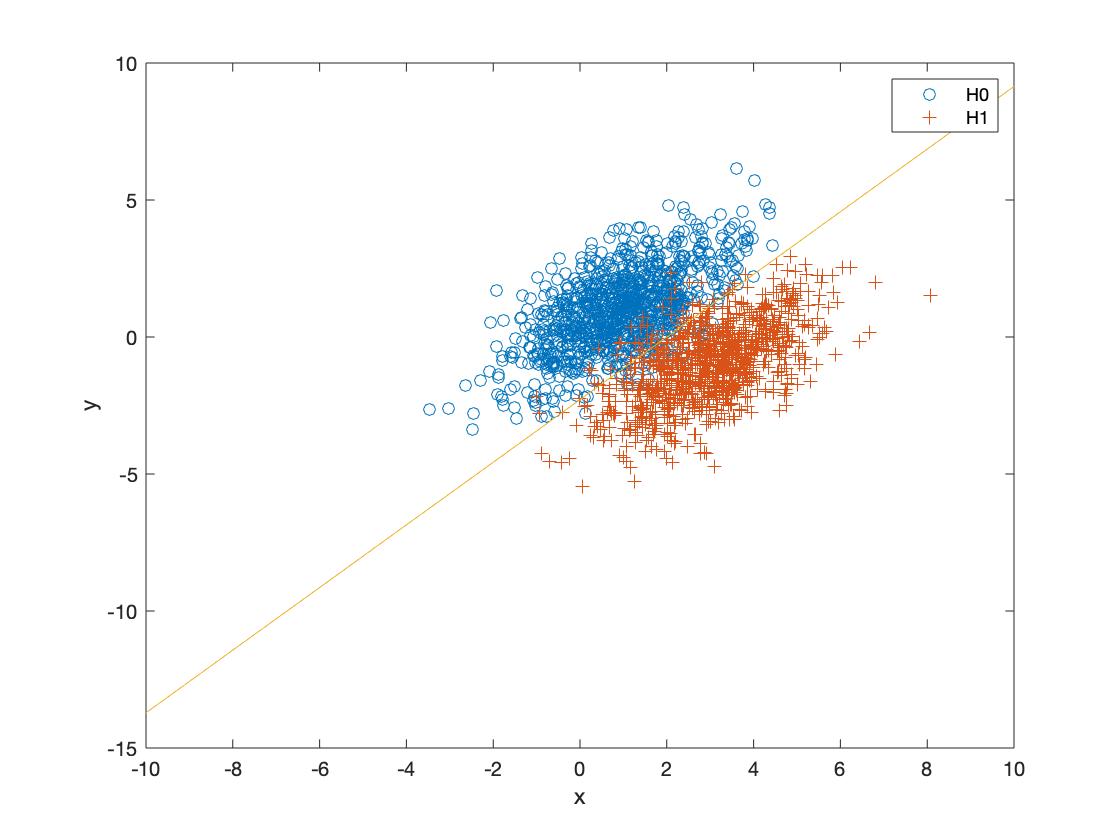
H0\_decision=(a\*partb\_H0\_data(:,1)+b\*partb\_H0\_data(:,2)+c)>0;

missH0=length(H0\_decision)-sum(H0\_decision);

H1\_decision=(a\*partb\_H1\_data(:,1)+b\*partb\_H1\_data(:,2)+c)>0;

missH1=sum(H1\_decision);

fracmiss=(missH1+missH0)/2000



fracmiss =

0.0460

c)

mx0=mean(partc\_H0\_data(:,1));

my0=mean(partc\_H0\_data(:,2));

mx1=mean(partc\_H1\_data(:,1));

my1=mean(partc\_H1\_data(:,2));

sx=sqrt(2);

sy=1;

rxy=0;

a=(2\*(mx0-mx1))/(sx)^2+(2\*rxy\*(my1-my0))/sx\*sy;

b=(2\*(my0-my1))/(sy)^2+(2\*rxy\*(mx1-mx0))/sx\*sy;

c=((mx1)^2-(mx0)^2)/(sx)^2+(2\*rxy\*(mx0\*my0-mx1\*my1))/sx\*sy+((my1)^2-(my0)^2)/(sy)^2;

x=-10:0.1:10;

y=-(a\*x+c)/b;

plot(partc\_H0\_data(:,1),partc\_H0\_data(:,2),'o',partc\_H1\_data(:,1),partc\_H1\_data(:,2),'+',x,y)

xlabel('x')

ylabel('y')

legend('H0','H1')

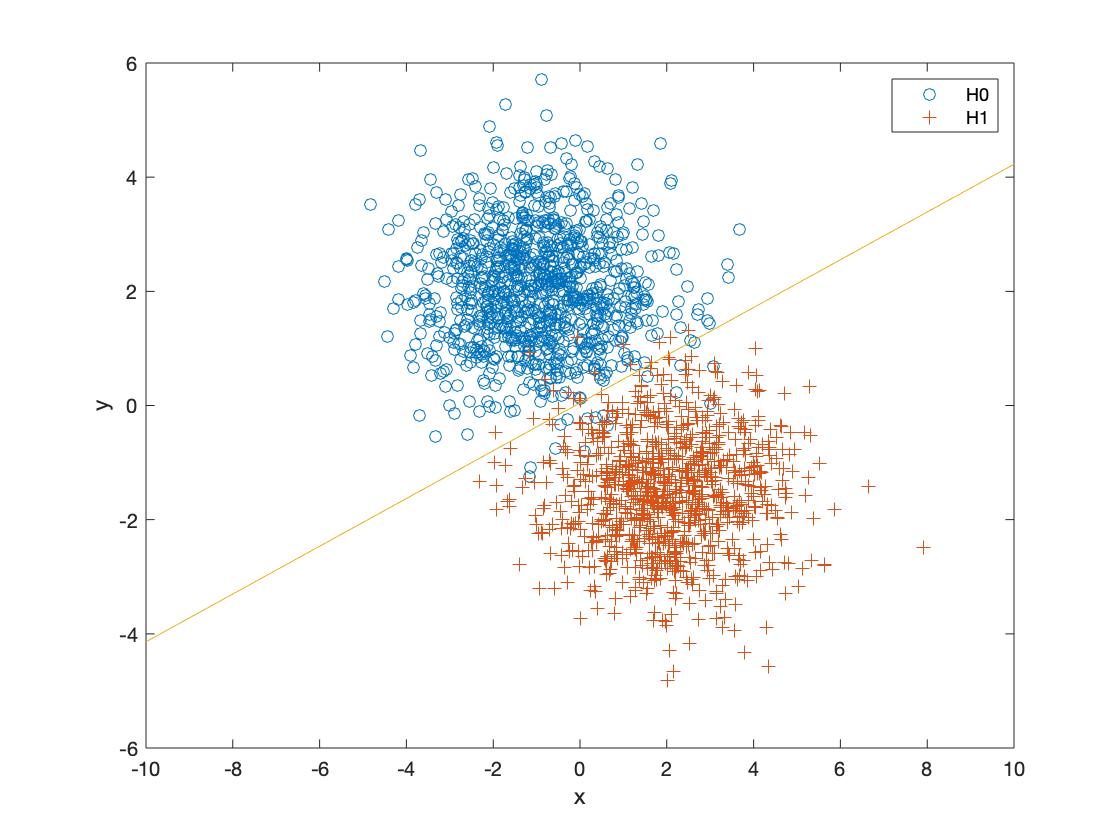
H0\_decision=(a\*partc\_H0\_data(:,1)+b\*partc\_H0\_data(:,2)+c)>0;

missH0=length(H0\_decision)-sum(H0\_decision);

H1\_decision=(a\*partc\_H1\_data(:,1)+b\*partc\_H1\_data(:,2)+c)>0;

missH1=sum(H1\_decision);

fracmiss=(missH1+missH0)/2000



fracmiss =

0.0180