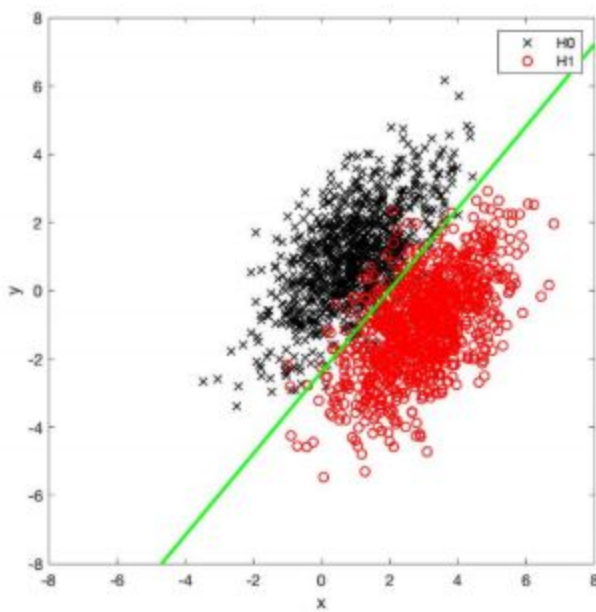
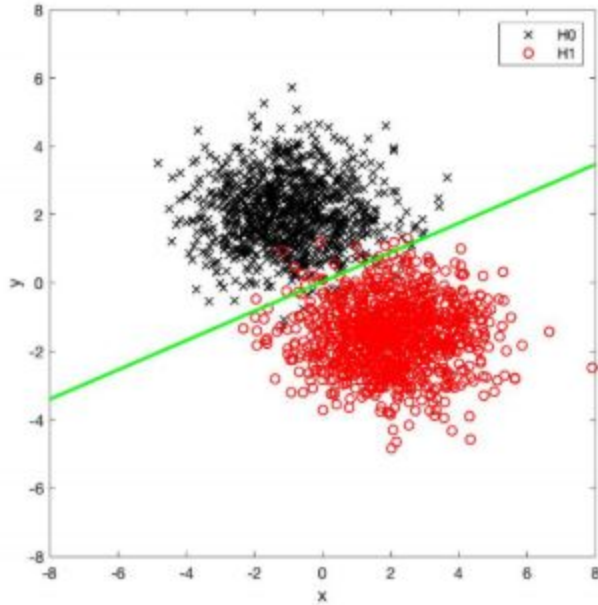


$P_{fa} = .016$   
 $P_{md} = .01$   
 $P_e = .013$



$P_{fa} = .045$   
 $P_{md} = .046$   
 $P_e = .0455$



$P_{fa} = .045$   
 $P_{md} = .046$   
 $P_e = .0455$

```

close all;
load gaussiandata

```

```

n = length(partc_H0_data);

```

```

for i = 1:3
    if(i==1),
        H0_data = parta_H0_data;
        H1_data = parta_H1_data;
    elseif(i == 2),
        H0_data = partb_H0_data;
        H1_data = partb_H1_data;
    elseif(i == 3),
        H0_data = partc_H0_data;
        H1_data = partc_H1_data;
    end

```

```

mX0 = 1/n*sum(H0_data(:,1));
mY0 = 1/n*sum(H0_data(:,2));
mX1 = 1/n*sum(H1_data(:,1));

```

```

mY1 = 1/n*sum(H1_data(:,2));
VarX = (1/(2*n)) * (sum((H0_data(:,1) - mX0).^2) + sum((H1_data(:,1) - mX1).^2));
VarX = (1/(2*n)) * (sum((H0_data(:,2) - mX0).^2) + sum((H1_data(:,2) - mY1).^2));
CovXY = (1/(2*n)) * (sum((H0_data(:,1) - mX0).*(H0_data(:,2) - mY0))...
    + sum((H1_data(:,1) - mX1).*(H1_data(:,2) - mY1)));

Sigma = [VarX CovXY; CovXY VarY];
m0 = [mX0;mY0];
m1 = [mX1;mY1];
iSigma = inv(Sigma);
d = (m1-m0)' * iSigma;
a = d(1); b = d(2);
c = 0.5*(m0' * iSigma * m0 - m1' * iSigma * m1);
count = 0;
H0errors = (a*H0_data(:,1)+b*H0_data(:,2)+c > 0);
H1errors = (a*H1_data(:,1)+b*H1_data(:,2)+c < 0);

PFA = sum(H-errors)/n
PMD = sum(H1errors)/n
Pe = 0.5*(PFA + PMD)
x = linspace(-8,8,500);
y = -a/b * x - c/b;

figure()
hold off
plot(H0_data(:,1),H0_data(:,2),'x','Color','k','MarkerSize',6)
hold on
plot(H1_data(:,1),H1_data(:,2),'x','Color','r','MarkerSize',6)
plot(x,y,'g','linewidth',2)
xlabel('x')
ylabel('y')
legend('H0','H1')
axis([-8 8 -8 8])
axis square
end

```