

REPORT
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2016CS10367

1(a)

Learning rate 0.1

Stopping criteria: when change in cost function is less than some epsilon

On Normalised data

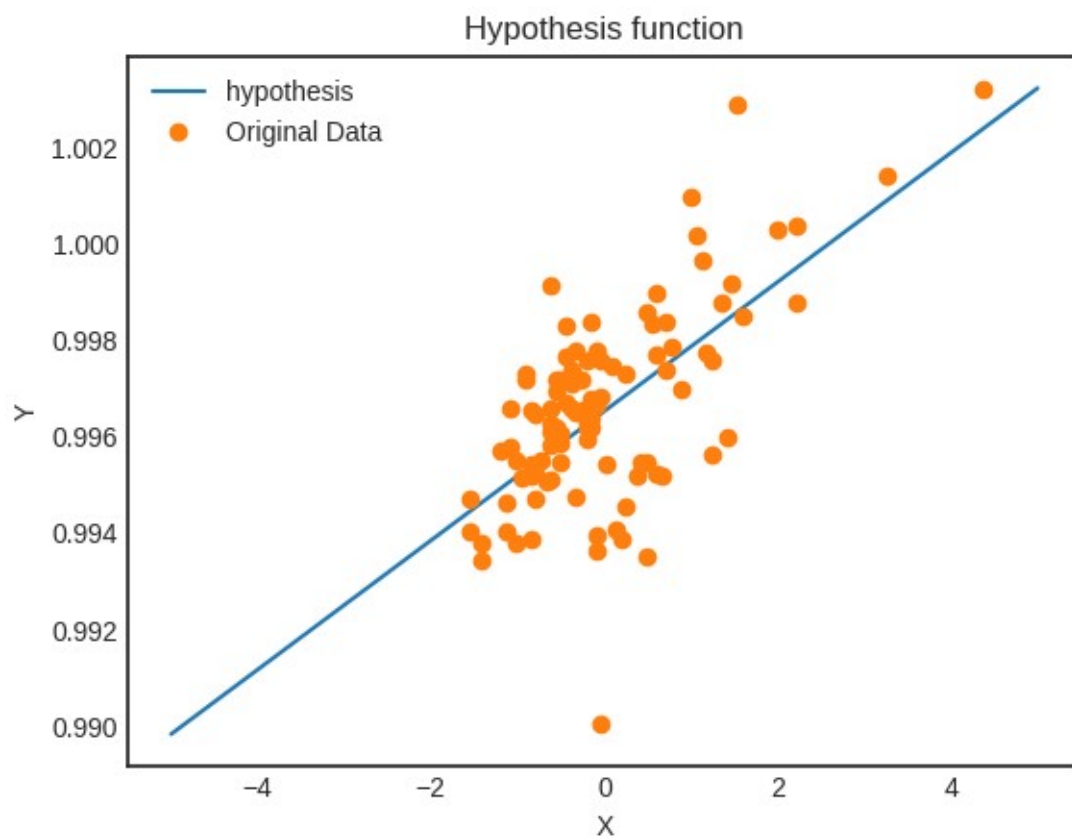
Theta :

[[0.99653652]

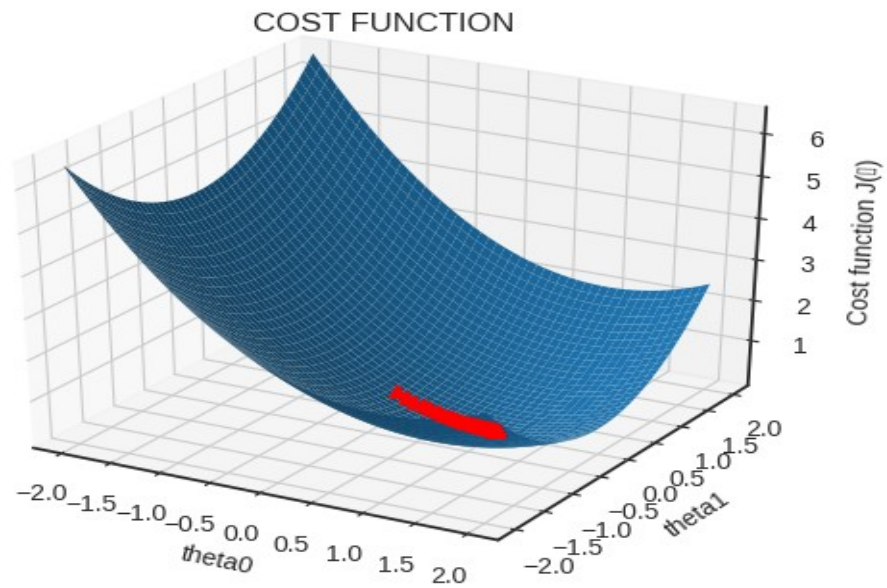
[0.00134037]]

1(b)

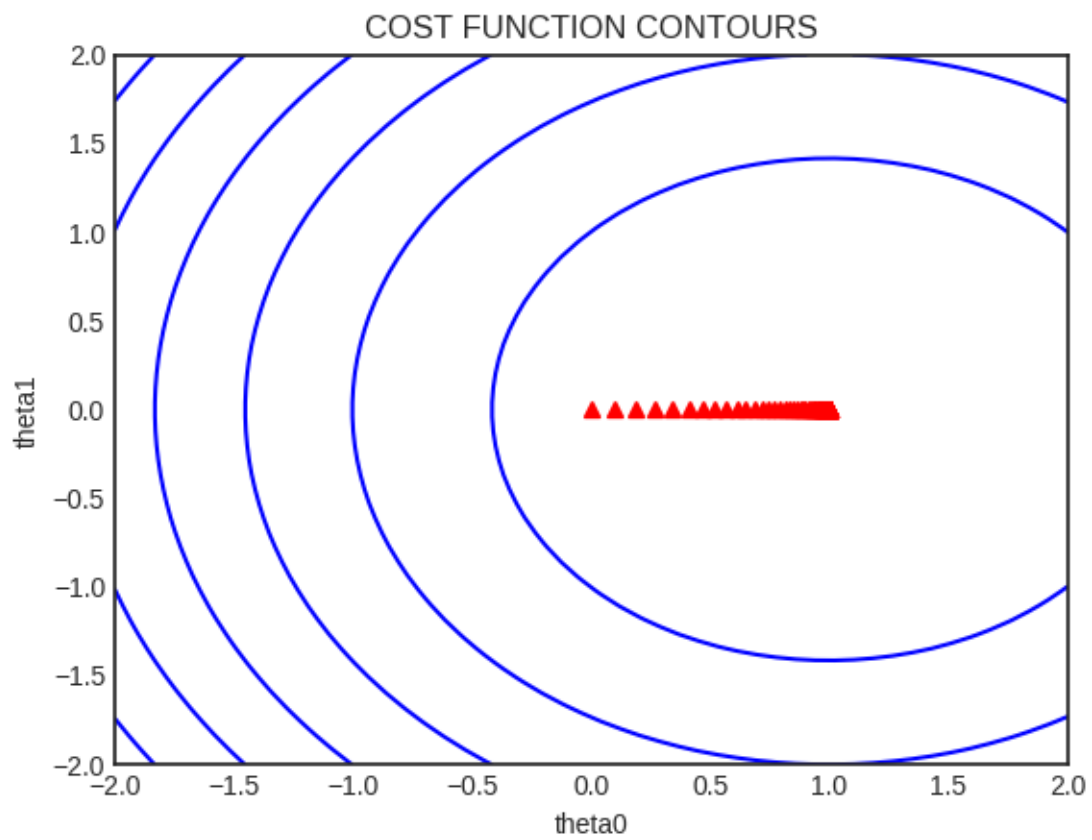
learning rate=0.1



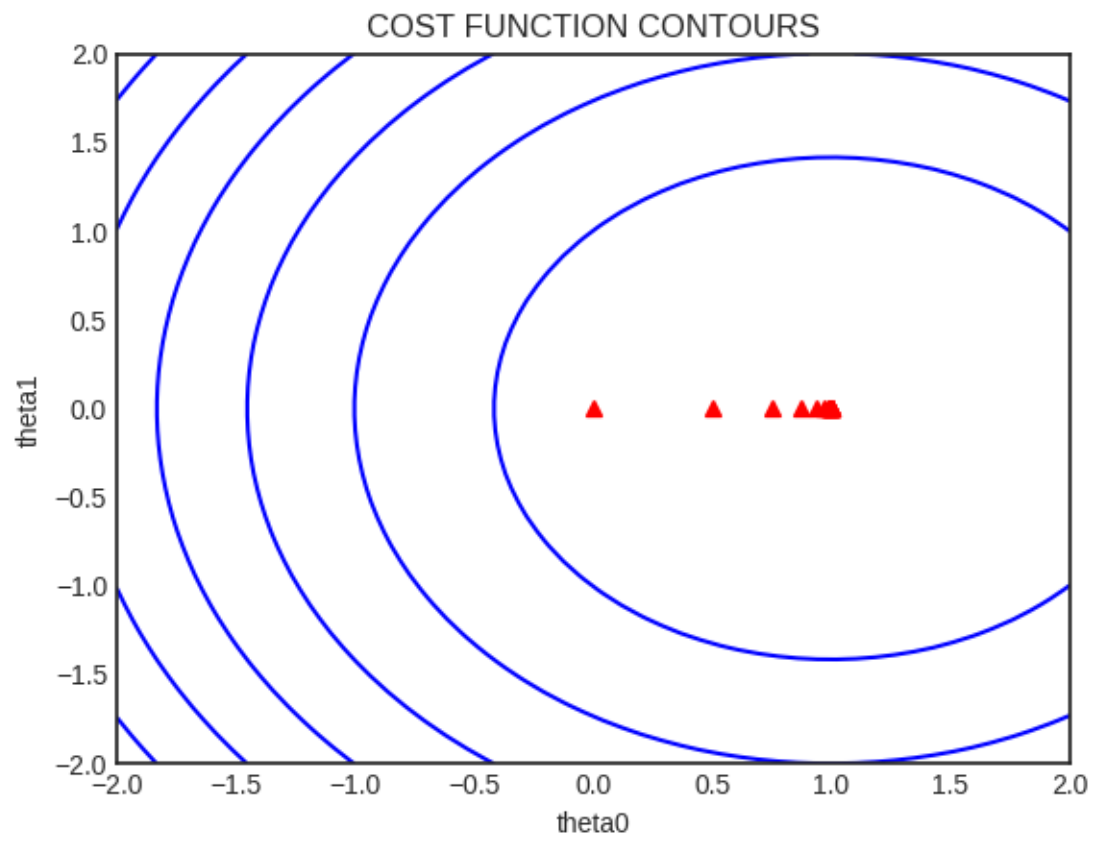
1(c)



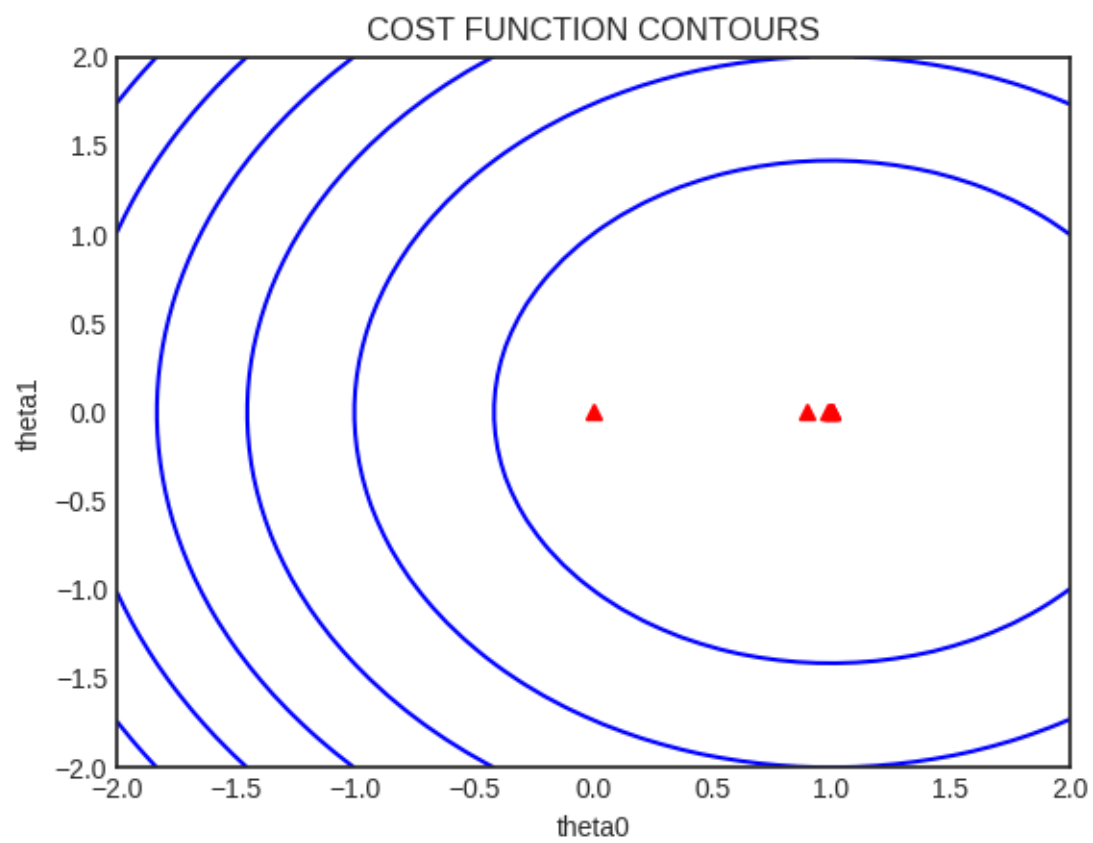
1(d)



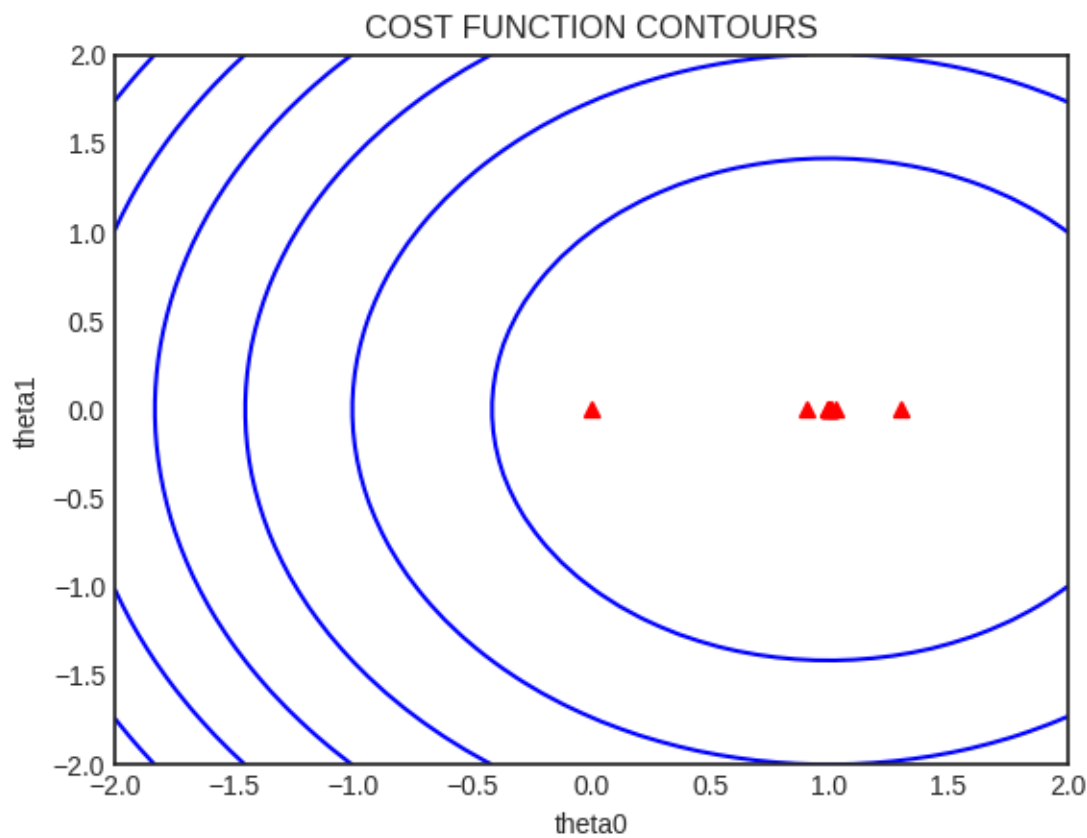
1(e)
for learning_rate=0.1
graphs are above
learning_rate=0.5



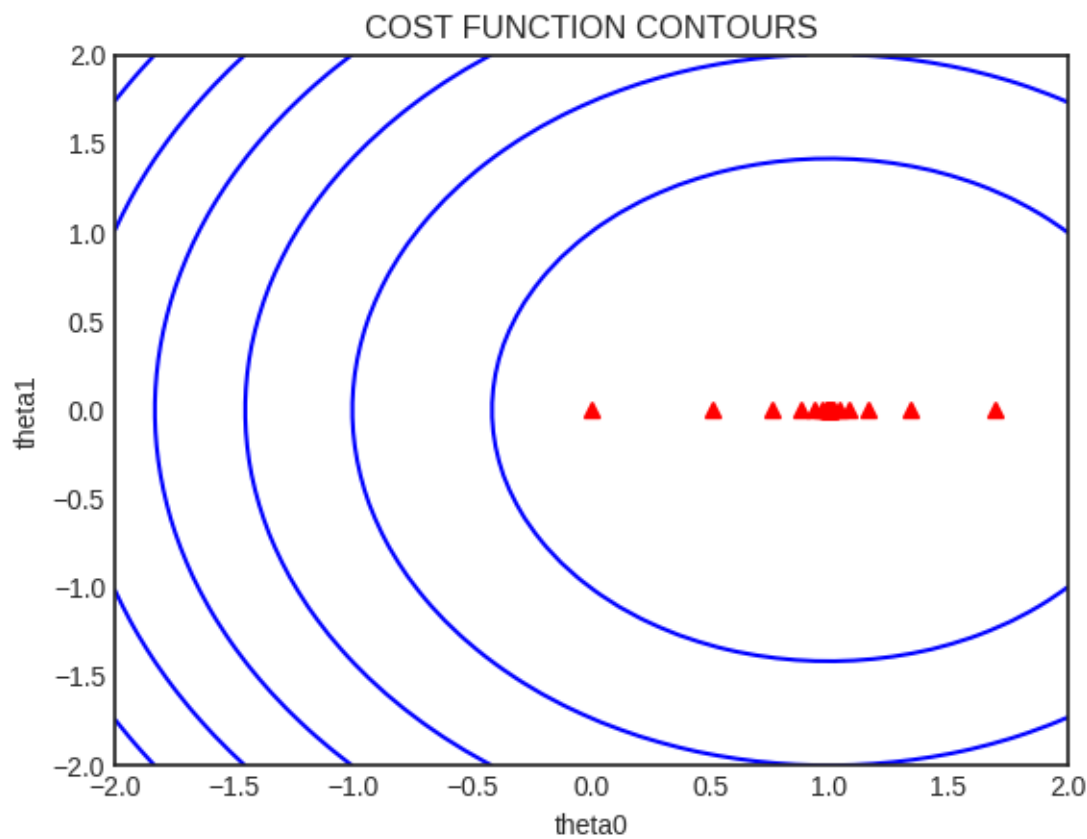
learning_rate=0.9

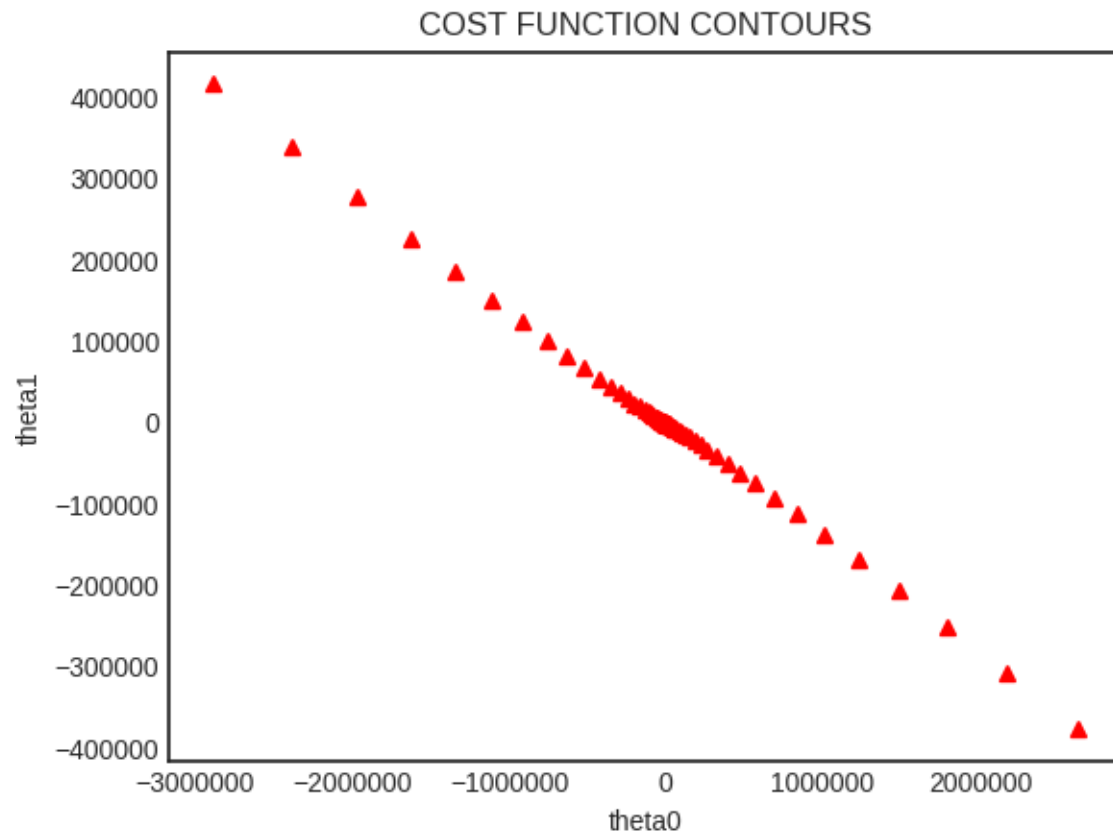


learning_rate=1.3

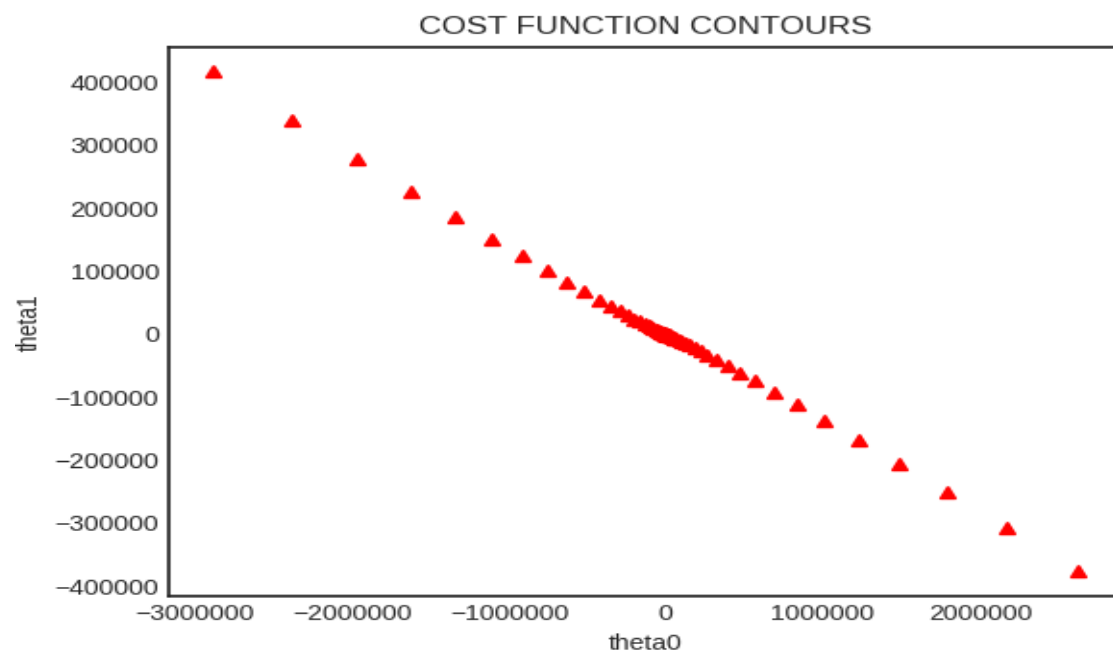


learning_rate=1.7





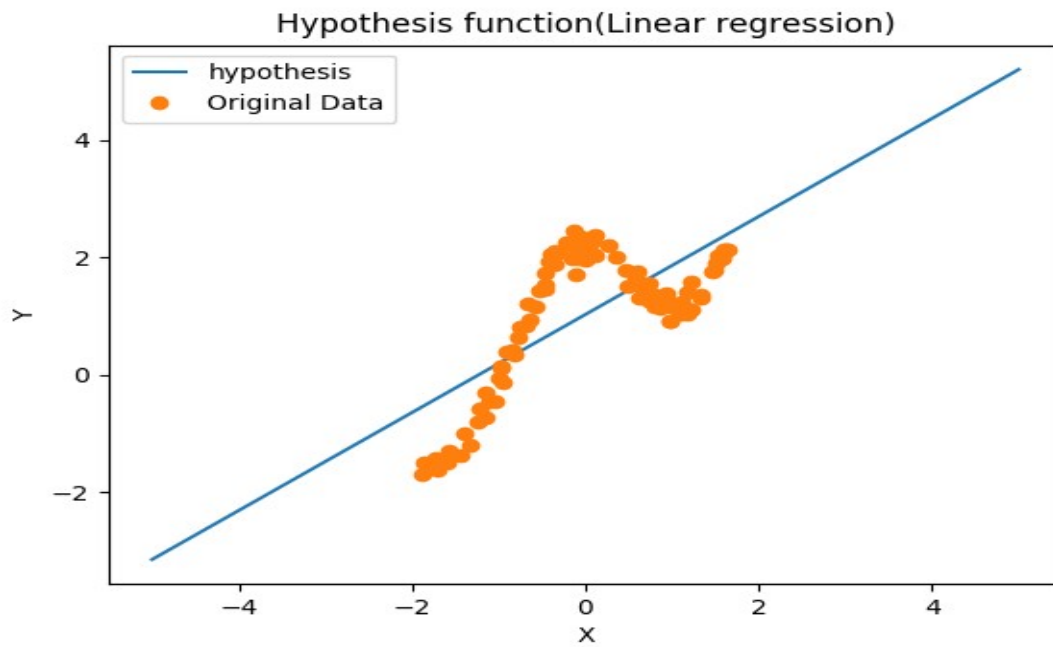
learning_rate=2.5



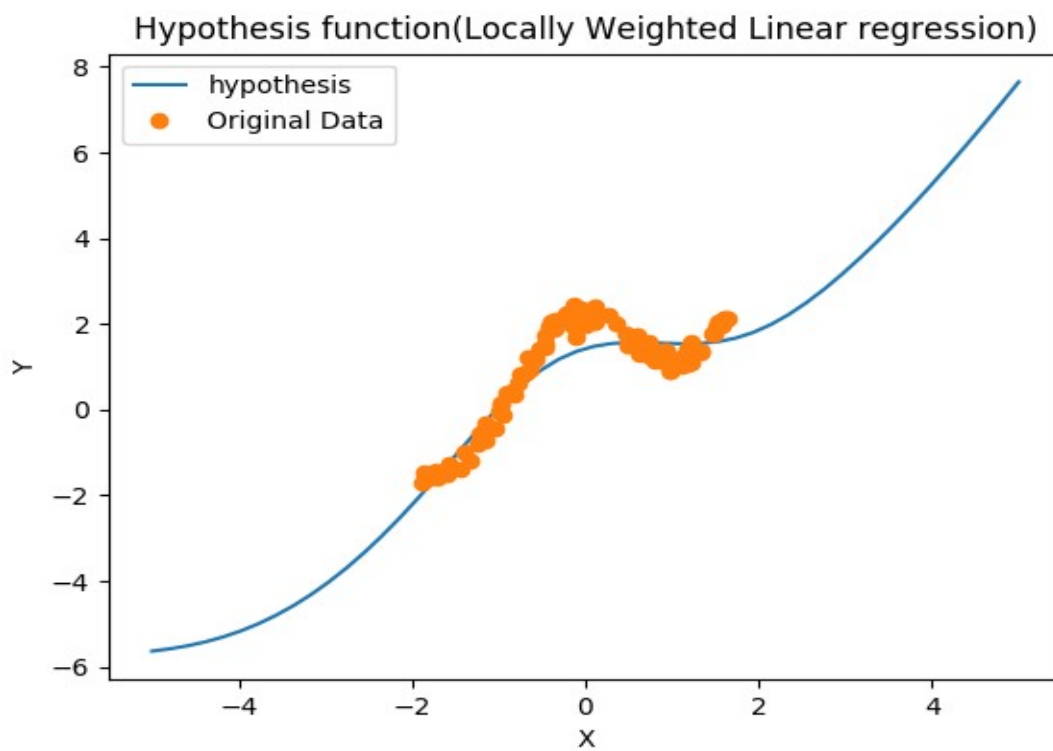
Observations:

for 2.1 or greater gradient descent doesn't converge

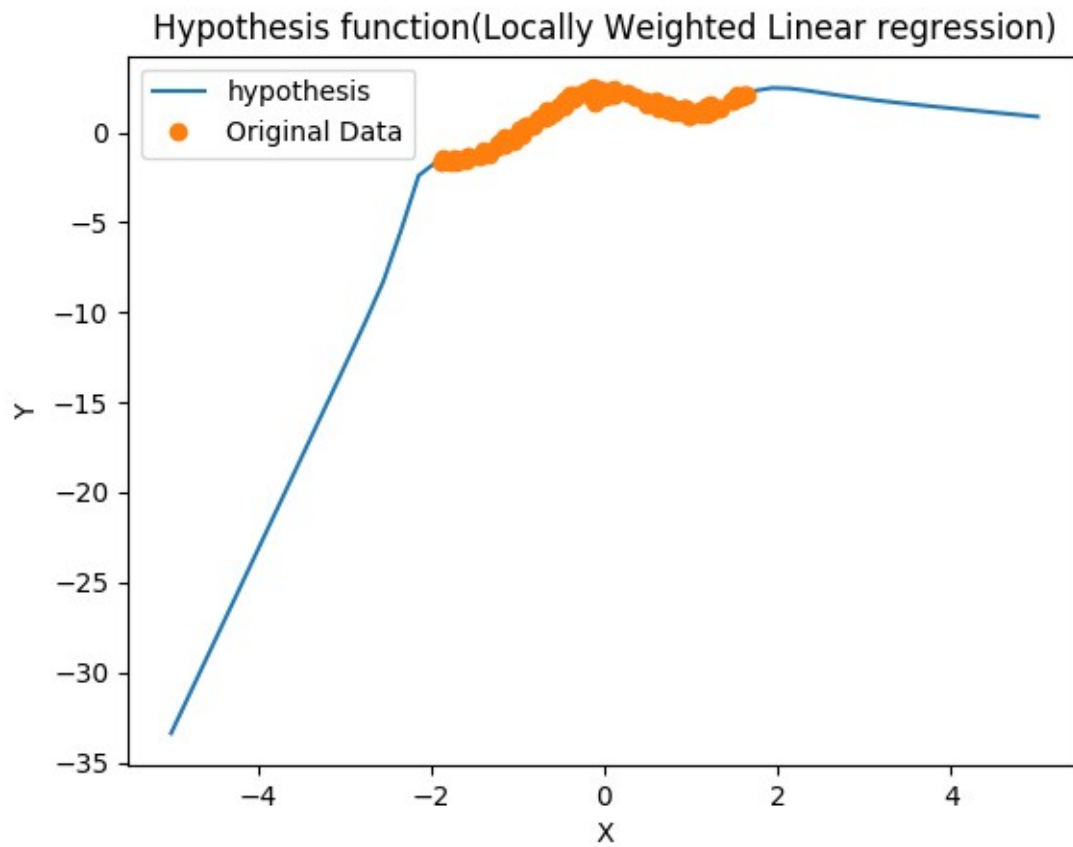
for greater than 0.9 and less than 2.1 it converges after jumping over the minima many times



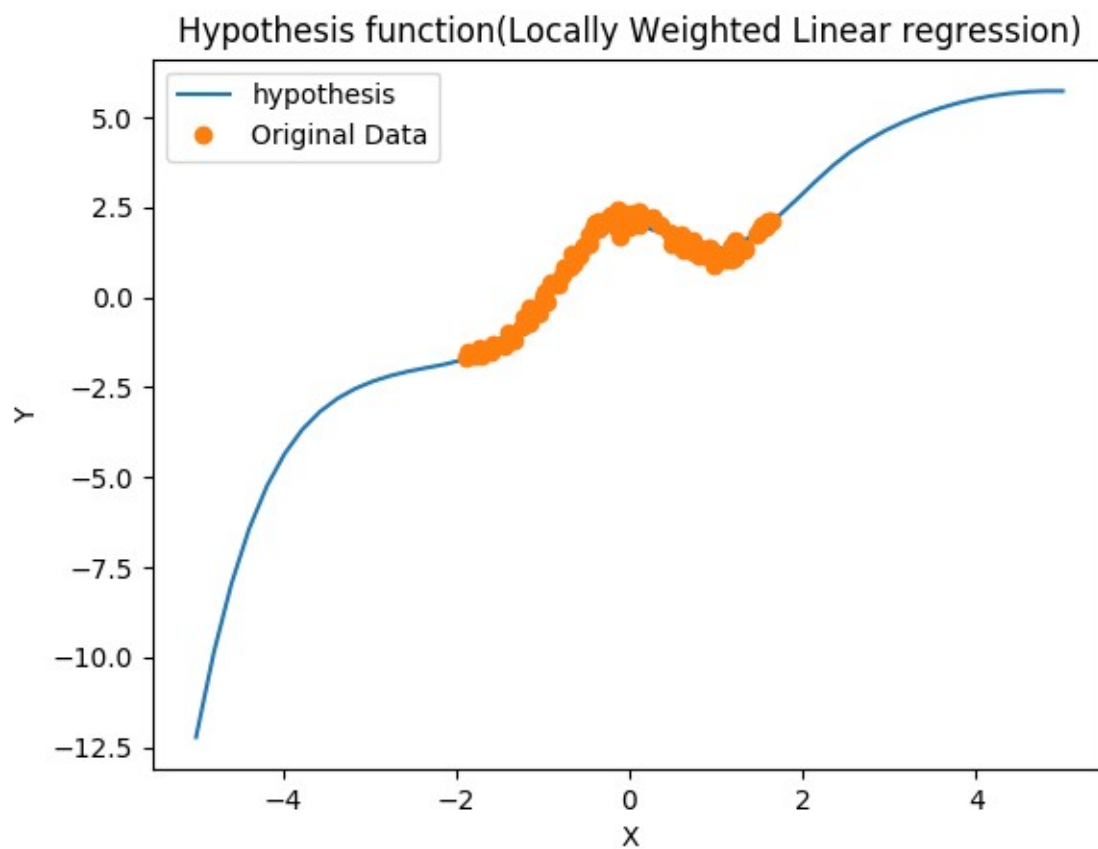
2(b)
tau=0.8



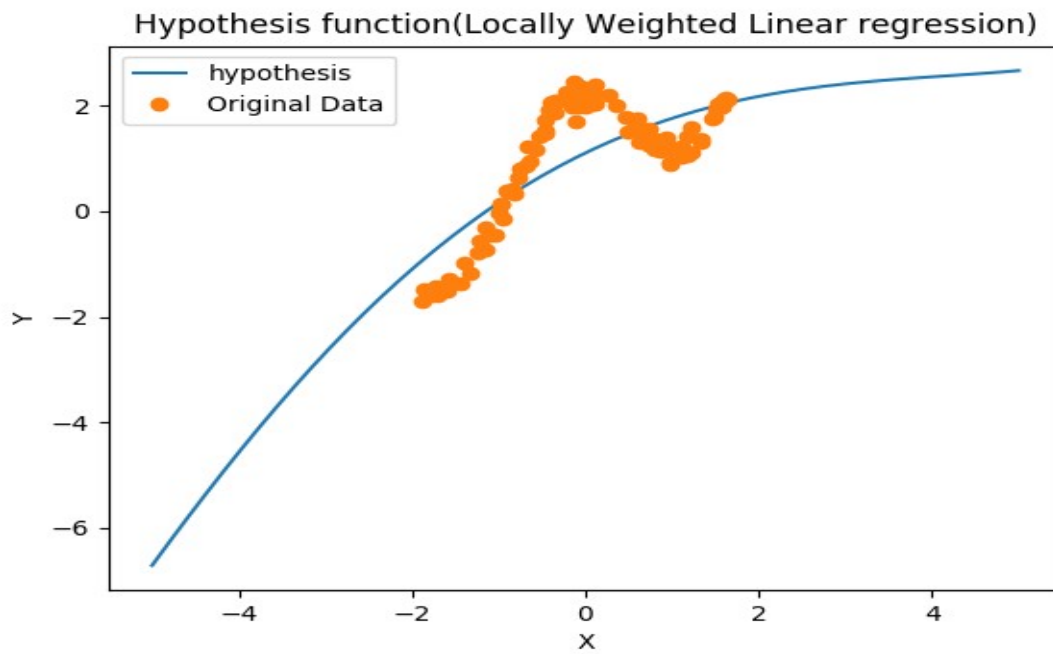
2(c)
tau=0.1



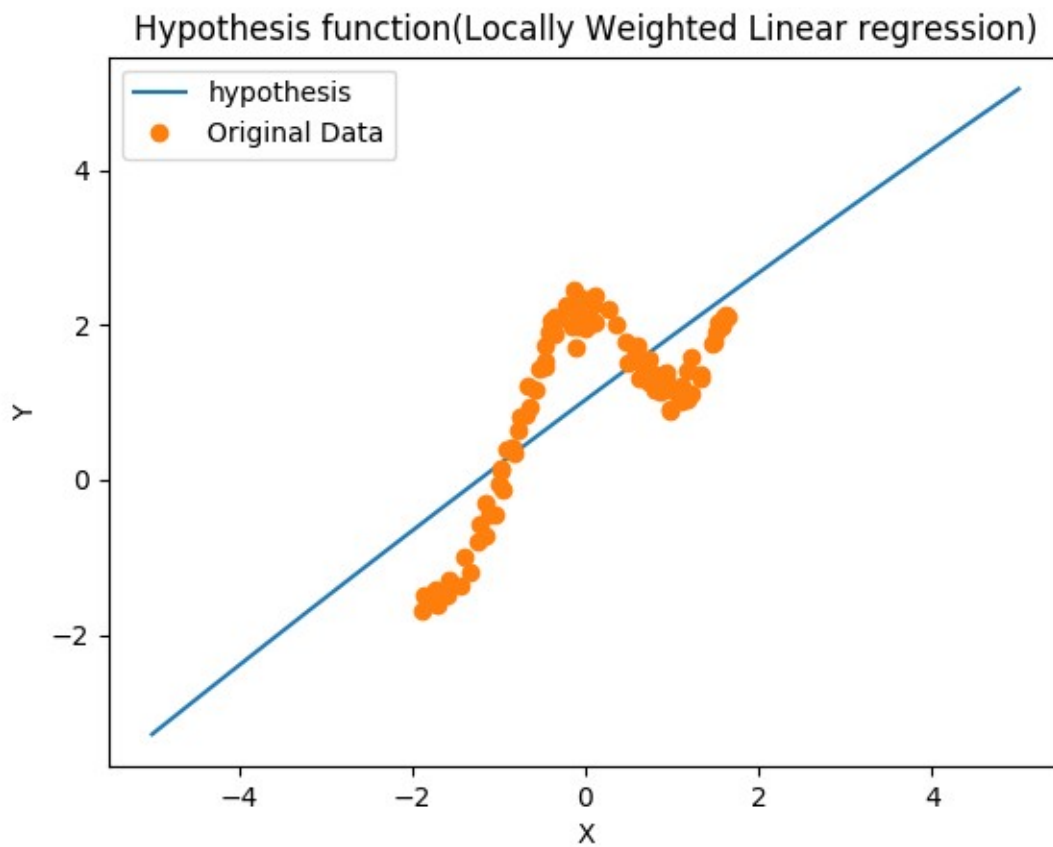
$\tau=0.3$



$\tau=2$



$\tau=10$

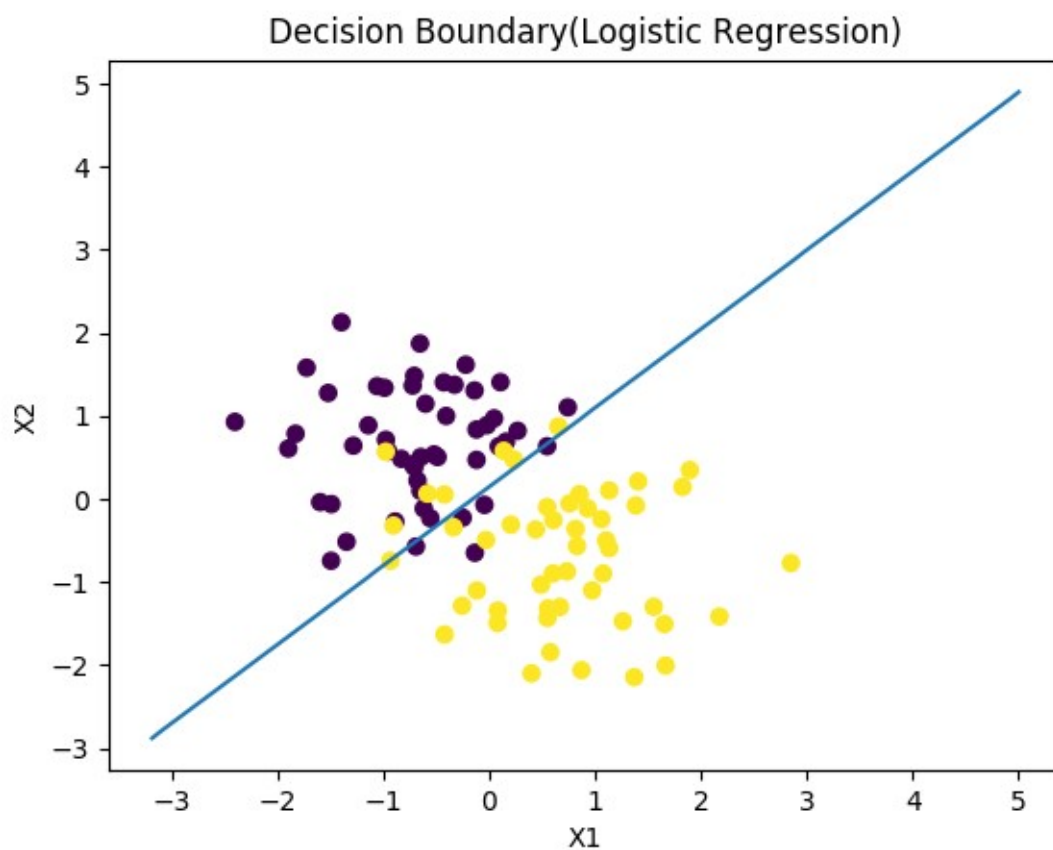


Observation:

for very small values of τ the hypothesis over fit the point i.e till 0.3 for our case
for larger value of τ ,it becomes similar to linear regression.

3(a) [0.4012307 , 2.60817385, -2.7452371]

3(b)



4(a)

$\mu_0 = \begin{bmatrix} 137.46 & 366.62 \end{bmatrix}$

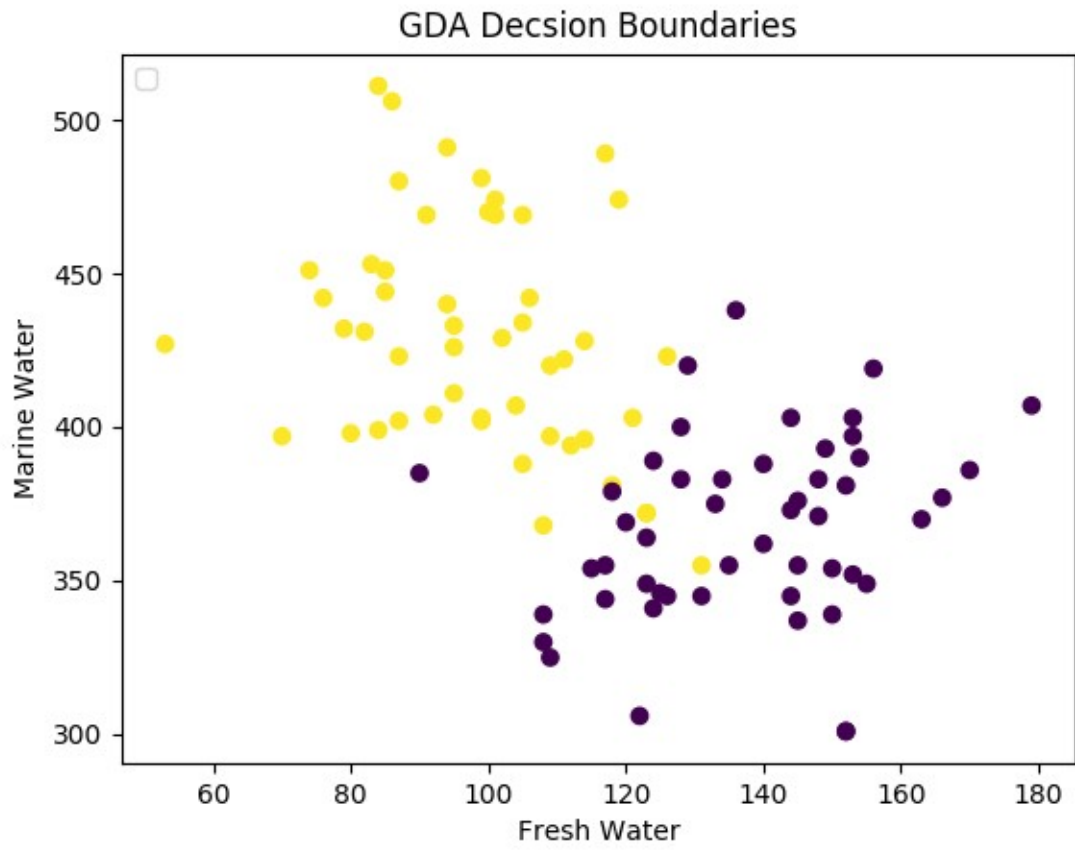
$\mu_1 = \begin{bmatrix} 98.38 & 429.66 \end{bmatrix}$

$E(\text{covariance}) =$

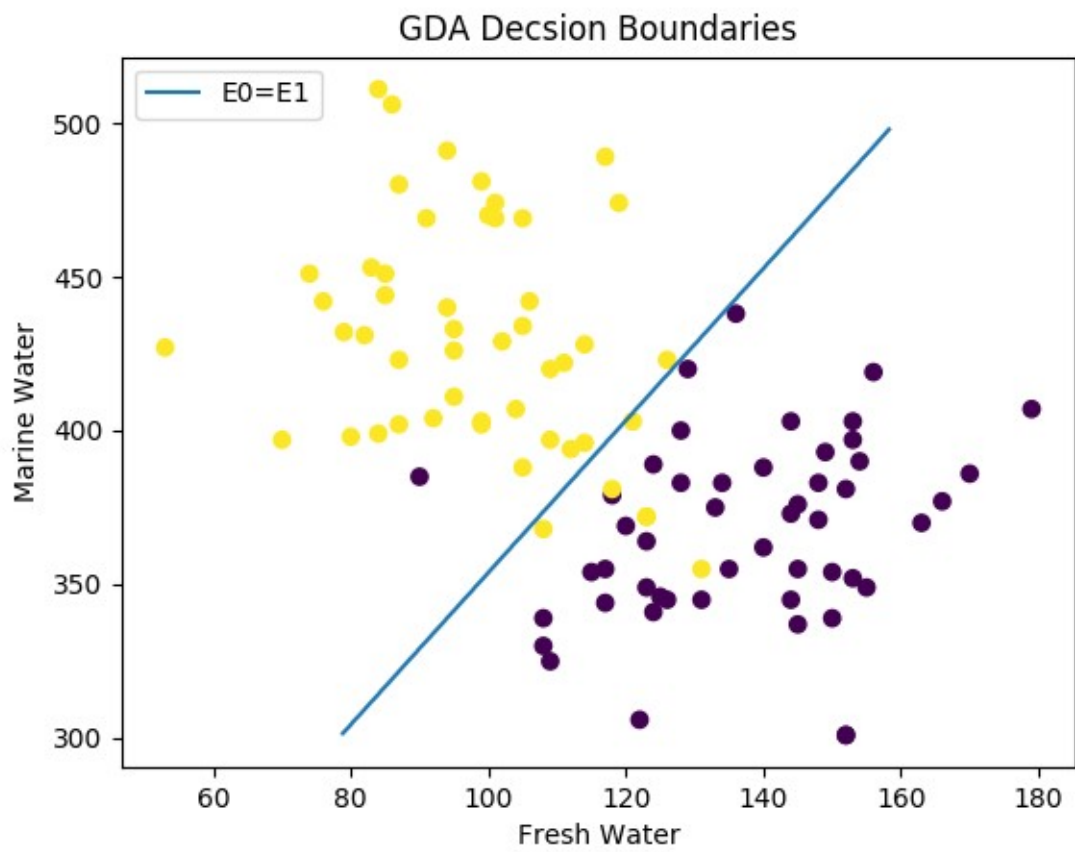
$\begin{bmatrix} 287.482 & -26.748 \end{bmatrix}$

$\begin{bmatrix} -26.748 & 1123.25 \end{bmatrix}$

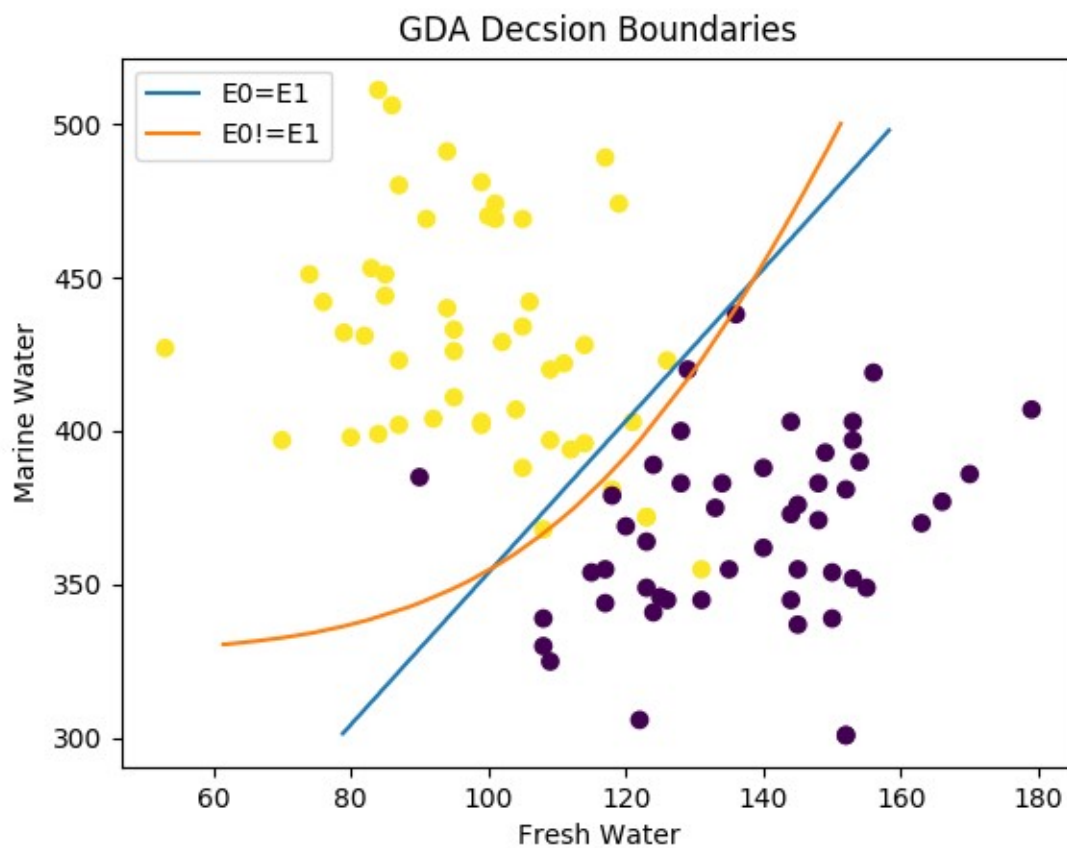
4(b)



4(c)



4(e)



4(d)

```
myu0= [[137.46 366.62]]
myu1= [[ 98.38 429.66]]
E0
[[319.5684 130.8348]
 [130.8348 875.3956]]
E1
[[ 255.3956 -184.3308]
 [-184.3308 1371.1044]]
```

4(f)

The the assumption of $E_0 = E_1$ is less general so, the second graph is more general.
The an also fit data in which one class is separate the a class which is fitting in between them.