DSC 540 - Topic 3 - Assignment-Part 2

August 25, 2021

Part 2: Find the Minima and plot the Contour plot

[20]:
```
import numpy as np
import matplotlib.pyplot as plt
```

[2]:
```
# Initialize two numpy arrays with all the values that has been calculated in␣
 ↪the Assignment
w1 = np.array([2,1.6,1.04])
w2 = np.array([-2,-0.4,-0.32])
```

[3]:
```
# Create a meshgrid of the two variables which will be used to plot the contour␣
 ↪plot
W1, W2 = np.meshgrid(w1,w2)
```

[4]:
```
W1
```

[4]:
```
array([[2.  , 1.6 , 1.04],
       [2.  , 1.6 , 1.04],
       [2.  , 1.6 , 1.04]])
```

[5]:
```
W2
```

[5]:
```
array([[-2.  , -2.  , -2.  ],
       [-0.4 , -0.4 , -0.4 ],
       [-0.32, -0.32, -0.32]])
```

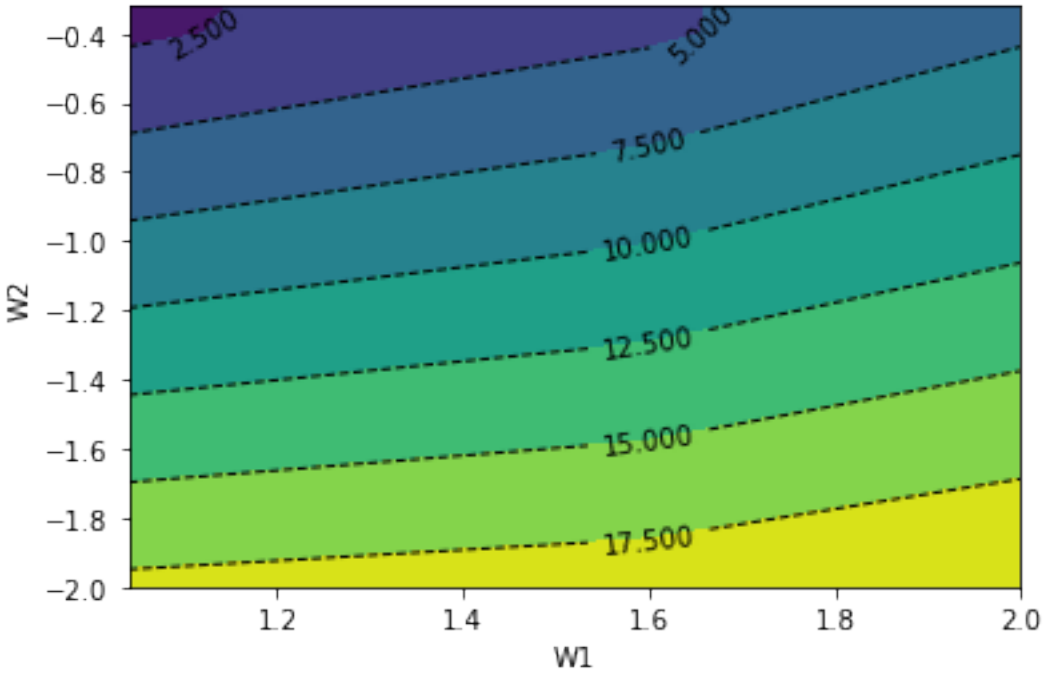
[6]:
```
# Define the function
Y = (2*np.square(W1)) + (2*W1*W2) + (5*np.square(W2))
```

[7]:
```
Y
```

[7]:
```
array([[20.    , 18.72  , 18.0032],
       [ 7.2   ,  4.64  ,  2.1312],
       [ 7.232 ,  4.608 ,  2.0096]])
```

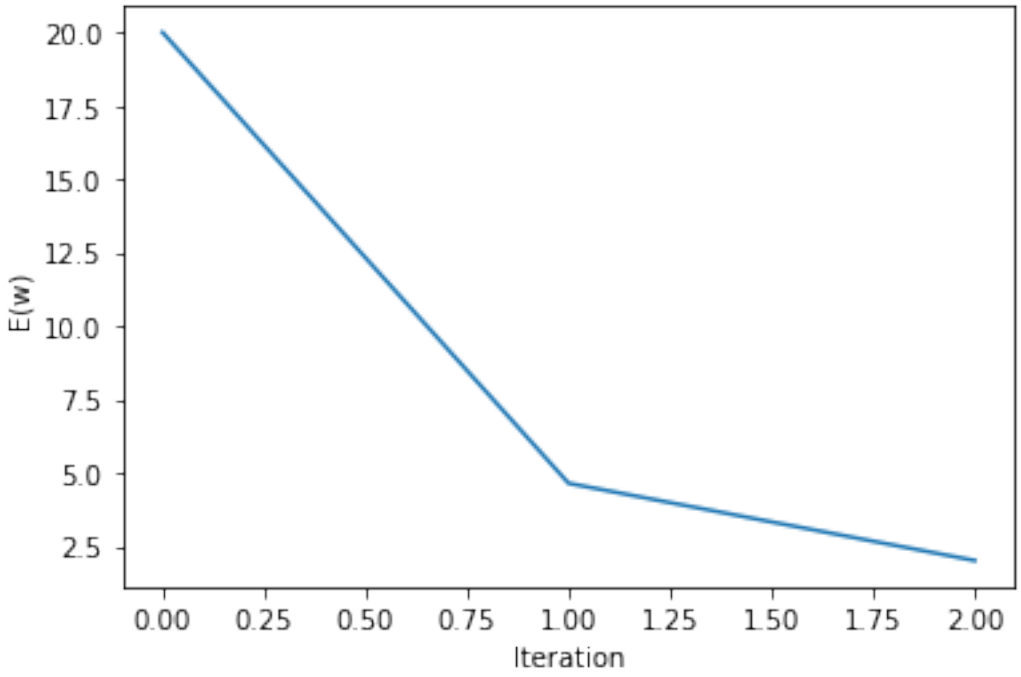
[8]:
```
# Create a Contour plot
cp = plt.contour(W1, W2, Y, colors='black', linestyles='dashed', linewidths=1)
plt.clabel(cp, inline=1, fontsize=10)
```

```
cp = plt.contourf(W1, W2, Y, )
plt.xlabel('W1')
plt.ylabel('W2')
plt.show()
```



[13]:
```
iter = np.array([0,1,2])
val = np.array([Y[0,0], Y[1,1],Y[2,2]])
```

[18]:
```
plt.plot(iter,val)
plt.xlabel('Iteration')
plt.ylabel('E(w)')
plt.show()
```


20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
E(w)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
Iteration

[ ]: