

[실습예제 12-2][도전!]

```
10 phi = lambda u: np.tanh(u)
11 dphi = lambda u: 1/np.cosh(u)**2
12
13 oldw, oldb = 0.0, 0.0
14 MaxIter = 10000
15 alpha = 1.0
16 ns = MaxIter/10
17 print('n={:5d}'.format(0))
18 for n in range(MaxIter):
19     gradw, gradb = 0.0, 0.0
20     for i in range(N):
21         ui = oldw*x[i]+oldb
22         gradb += 1/N*(phi(ui)-t[i])*dphi(ui)
23         gradw += 1/N*(phi(ui)-t[i])*dphi(ui)*x[i]
24
25     neww, newb = oldw-alpha*gradw, oldb-alpha*gradb
26     oldw, oldb = neww, newb
27
28     Eval = 0.0
29     for i in range(N):
30         ui = oldw*x[i]+oldb
31         Eval += 0.5/N*(phi(ui)-t[i])**2
32
33     if (n+1)%ns == 0:
34         print('n={:5d}, Eval={:.4f}'.format(n+1, Eval))
```

```
n=      0
n= 1000, Eval=0.0003
n= 2000, Eval=0.0002
n= 3000, Eval=0.0001
n= 4000, Eval=0.0001
n= 5000, Eval=0.0001
n= 6000, Eval=0.0001
n= 7000, Eval=0.0000
n= 8000, Eval=0.0000
n= 9000, Eval=0.0000
n=10000, Eval=0.0000
```

```
35 xx = np.linspace(-2.5, 2.5)
36 yy = phi(oldw*xx+oldb)
37 plt.plot(xx, yy, 'k')
38 plt.plot(x, t, 'ro')
39 plt.show()
```

