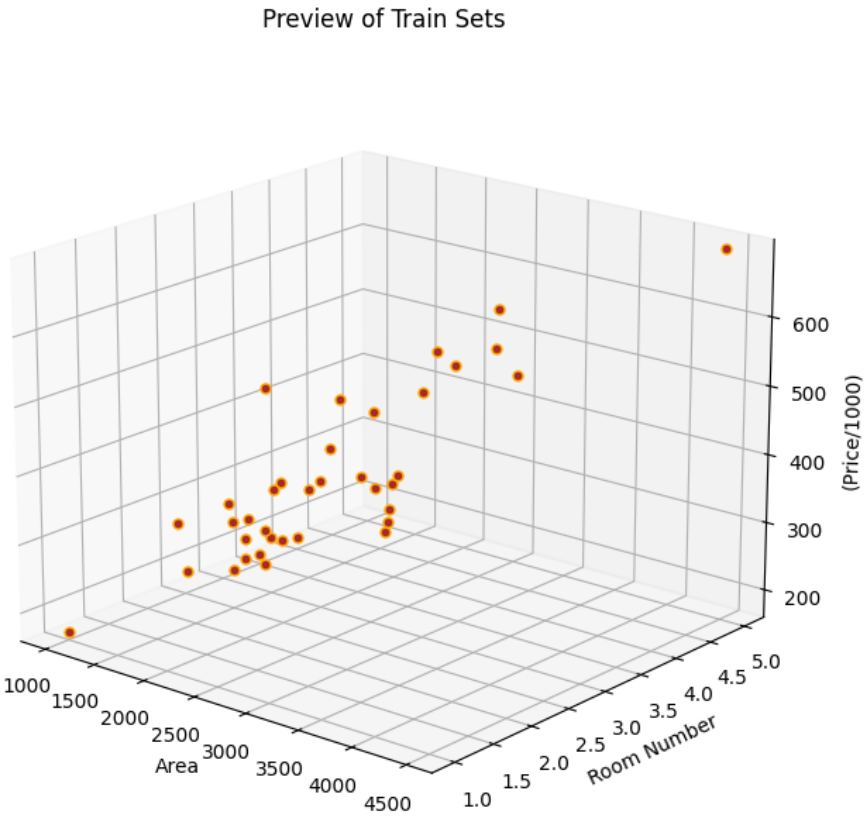
```
      面积  房间数      价格
37  2132    4  345000
38  4215    4  549000
39  2162    4  287000
40  1664    2  368500
41  2238    3  329900
42  2567    4  314000
43  1200    3  299000
44   852    2  179900
45  1852    4  299900
46  1203    3  239500
                面积        房间数             价格
count    47.000000  47.000000      47.000000
mean   2000.680851   3.170213  340412.659574
std     794.702354   0.760982  125039.899586
min     852.000000   1.000000  169900.000000
25%    1432.000000   3.000000  249900.000000
50%    1888.000000   3.000000  299900.000000
75%    2269.000000   4.000000  384450.000000
max    4478.000000   5.000000  699900.000000
```



定理 8.2.2　如果函数 $z=f(x,y)$ 在点 (x,y) 处可微分，则该函数在点 (x,y) 的偏导数必定存在，且函数 $z=f(x,y)$ 在点 (x,y) 的全微分和梯度（导向量）分别为

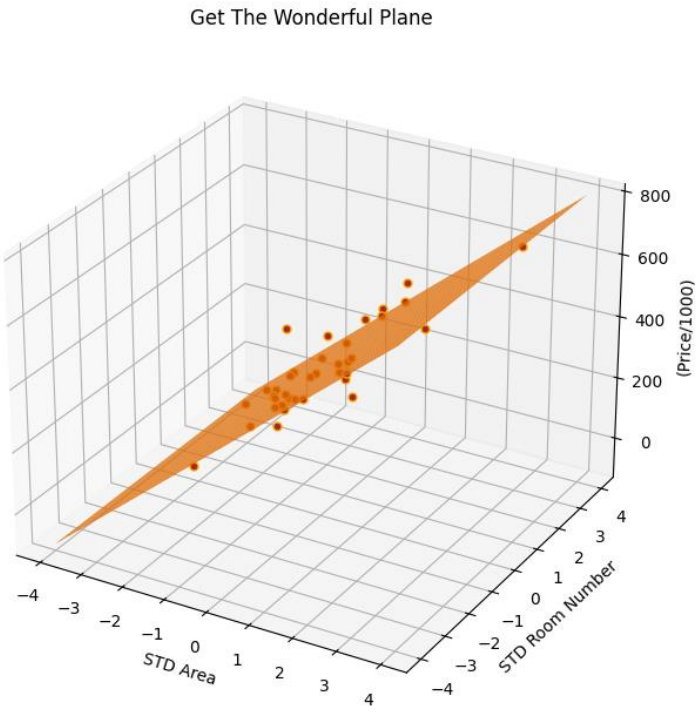
$$\mathrm{d}z=\frac{\partial z}{\partial x}\mathrm{d}x+\frac{\partial z}{\partial y}\mathrm{d}y \tag{8.2.6}$$

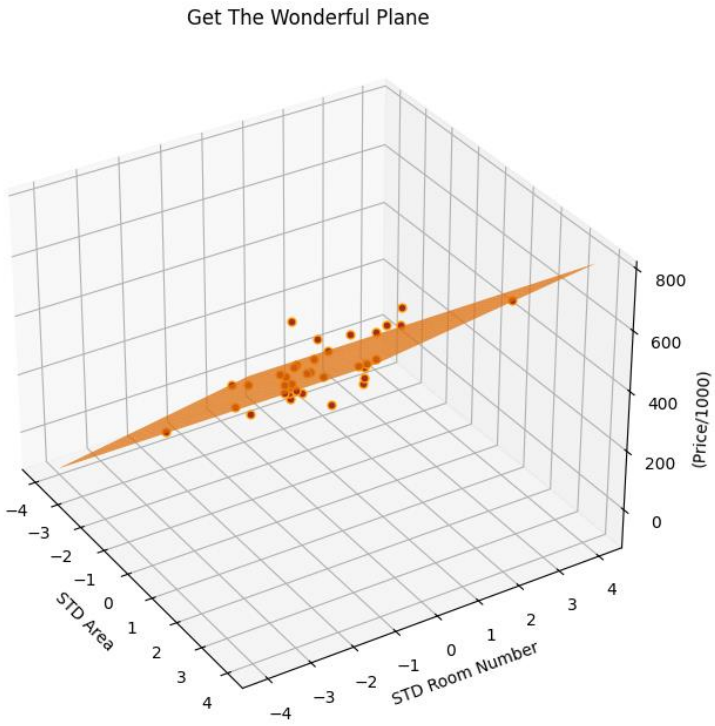
和

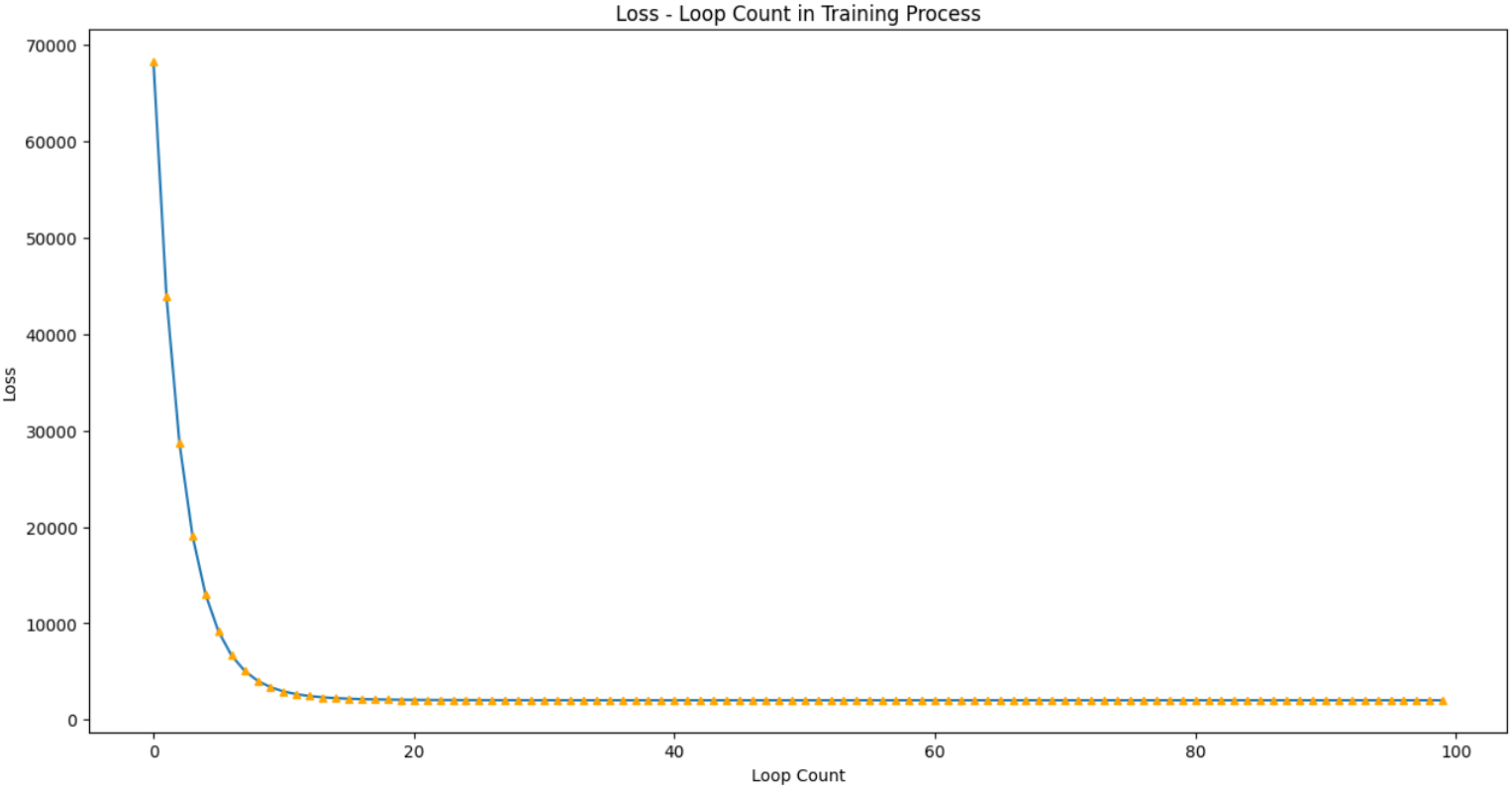
$$\mathbf{grad}\ f=\left(\frac{\partial z}{\partial x},\frac{\partial z}{\partial y}\right).$$

若分别称(8.2.6)式中 $\frac{\partial z}{\partial x}\mathrm{d}x$ 和 $\frac{\partial z}{\partial y}\mathrm{d}y$ 为函数对变量 x 和 y 的偏微分，则二元函数的全微分等于它的两个偏微分之和，称之为二元函数微分的叠加原理.这一原理也适用于二元以上的函数，例如，函数 $u=f(x,y,z)$ 如果在点 (x,y,z) 处可微分，则全微分为

$$\mathrm{d}u=\frac{\partial u}{\partial x}\mathrm{d}x+\frac{\partial u}{\partial y}\mathrm{d}y+\frac{\partial u}{\partial z}\mathrm{d}z.$$






Loss - Loop Count in Training Process
Loss
Loop Count
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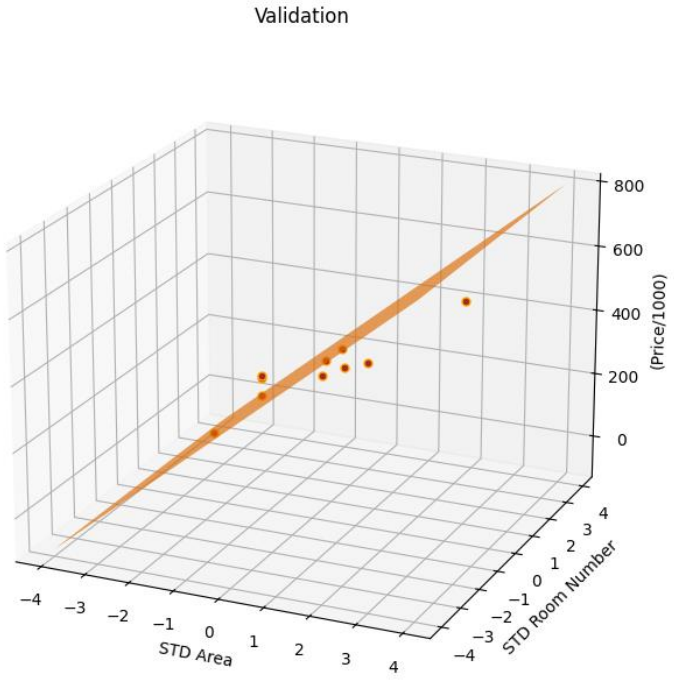
60000
50000
40000
30000
20000
10000
0
0
20
40
60
80
100


Validation
STD Area
STD Room Number
(Price/1000)
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600
400
200
0
−4
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−2
−1
0
1
2
3
4