Cost Landscape Plotting

Data =

$\mathbf{x}_1$	$\mathbf{x}_2$	$\mathbf{y}$
0	1	4
2	1	8
1	1	6
2	0	5

1. คำนวณ $\hat{y} = w_0 + w_1x_1 + w_2x_2$ จาก w_1 และ w_2 แต่ละชุด (เพื่อความสะดวก เรากำหนดให้ $w_0 = 1$ เสมอ)

		$w_0 = 1$ $w_1 = 1.2$ $w_2 = -1$	$w_0 = 1$ $w_1 = 1.4$ $w_2 = 0$	$w_0 = 1$ $w_1 = 1.6$ $w_2 = 1$	$w_0 = 1$ $w_1 = 1.8$ $w_2 = 2$	$w_0 = 1$ $w_1 = 2$ $w_2 = 3$	$w_0 = 1$ $w_1 = 2.2$ $w_2 = 4$	$w_0 = 1$ $w_1 = 2.4$ $w_2 = 5$	$w_0 = 1$ $w_1 = 2.6$ $w_2 = 6$	$w_0 = 1$ $w_1 = 2.8$ $w_2 = 7$
$\mathbf{x_1}$	$\mathbf{x_2}$	$\hat{\mathbf{y}}_1$	$\hat{\mathbf{y}}_2$	$\hat{\mathbf{y}}_3$	$\hat{\mathbf{y}}_4$	$\hat{\mathbf{y}}_5$	$\hat{\mathbf{y}}_6$	$\hat{\mathbf{y}}_7$	$\hat{\mathbf{y}}_8$	$\hat{\mathbf{y}}_9$
0	1	0	1	2	3	4	5	6	7	8
2	1	2.4	3.8	5.2	6.6	8	9.4	10.8	12.2	13.6
1	1	1.2	2.4	3.6	4.8	6	7.2	8.4	9.6	10.8
2	0	3.4	3.8	4.2	4.6	5	5.4	5.8	6.2	6.6

2. คำนวณ $Cost = \sum_{i=1}^{n}(y_i - \hat{y}_i)^2$ ของ $\hat{\mathbf{y}}$ แต่ละชุด

ตัวอย่างเช่น

$w_0 = 1$ $w_1 = 1.6$ $w_2 = 1$			
$\hat{\mathbf{y}}_3$	$\mathbf{y}$	$y - \hat{y}_1$	$(y - \hat{y}_1)^2$
2	4	-2	4
5.2	8	-2.8	7.84
3.6	6	-2.4	5.76
4.2	5	-0.8	0.64
		$Cost =$	18.24

3. นำ $Cost$ ของ weight แต่ละชุดไป plot ลงกราฟ

	$w_0 = 1$ $w_1 = 1.2$ $w_2 = -1$	$w_0 = 1$ $w_1 = 1.4$ $w_2 = 0$	$w_0 = 1$ $w_1 = 1.6$ $w_2 = 1$	$w_0 = 1$ $w_1 = 1.8$ $w_2 = 2$	$w_0 = 1$ $w_1 = 2$ $w_2 = 3$	$w_0 = 1$ $w_1 = 2.2$ $w_2 = 4$	$w_0 = 1$ $w_1 = 2.4$ $w_2 = 5$	$w_0 = 1$ $w_1 = 2.6$ $w_2 = 6$	$w_0 = 1$ $w_1 = 2.8$ $w_2 = 7$
$Cost$	72.96	41.04	18.24	4.56	0	4.56	18.24	41.04	72.96