

Two-Level Orthogonal Arrays

L4 Standard Array*

Trial no.	Column no.		
	1	2	3
1	1	1	1
2	1	2	2
3	2	1	2
4	2	2	1

*Two-level arrays from Genichi Taguchi and Yu-in Wu, *Off-Line Quality Control*, Central Japan Quality Control Association, Nagaya, 1979, pp. 103-107.

L8 Standard Array

Trial no.	Column no.						
	1	2	3	4	5	6	7
1	1	1	1	1	1	1	1
2	1	1	1	2	2	2	2
3	1	2	2	1	1	2	2
4	1	2	2	2	2	1	1
5	2	1	2	1	2	1	2
6	2	1	2	2	1	2	1
7	2	2	1	1	2	2	1
8	2	2	1	2	1	1	2

L8 Modified Array (one four-level factor)

Trial no.	Standard column no.				
	123	4	5	6	7
	Modified column no.				
	1	2	3	4	5
1	1	1	1	1	1
2	1	2	2	2	2
3	2	1	1	2	2
4	2	2	2	1	1
5	3	1	2	1	2
6	3	2	1	2	1
7	4	1	2	2	1
8	4	2	1	1	2

İki seviyeli ortogonal dizi -örnek

L8 Dizayn Matrisi

Standart Sıra	ETKİLER						
	A	B	C	AB	AC	BC	ABC
1	-	-	-	+	+	+	-
2	-	-	+	+	-	-	+
3	-	+	-	-	+	-	+
4	-	+	+	-	-	+	-
5	+	-	-	-	-	+	+
6	+	-	+	-	+	-	-
7	+	+	-	+	-	-	-
8	+	+	+	+	+	+	+
Kolon No.	1	2	3	4	5	6	7

Gözlem Değeri Y

25

21

44

43

38

31

40

36

İki düzeyli dört faktörlü L16 Deneyleri

L16 Dizayn matrisi

STANDART SIRA	ETKİLER														
	A	B	C	D	AB	AC	AD	BC	BD	CD	ABC	ABD	ACD	BCD	ABCD
1	-	-	-	-	+	+	+	+	+	+	-	-	-	-	+
2	-	-	-	+	+	+	-	+	-	-	-	+	+	+	-
3	-	-	+	-	+	-	+	-	+	-	+	-	+	+	-
4	-	-	+	+	+	-	-	-	-	+	+	+	-	-	+
5	-	+	-	-	-	+	+	-	-	+	+	+	-	+	-
6	-	+	-	+	-	+	-	-	+	-	+	-	+	-	+
7	-	+	+	-	-	-	+	+	-	-	-	+	+	-	+
8	-	+	+	+	-	-	-	+	+	+	-	-	-	+	-
9	+	-	-	-	-	-	-	+	+	+	+	+	+	-	-
10	+	-	-	+	-	-	+	+	-	-	+	-	-	+	+
11	+	-	+	-	-	+	-	-	+	-	-	+	-	+	+
12	+	-	+	+	-	+	+	-	-	+	-	-	+	-	-
13	+	+	-	-	+	-	-	-	-	+	-	-	+	+	+
14	+	+	-	+	+	-	+	-	+	-	-	+	-	-	-
15	+	+	+	-	+	+	-	+	-	-	+	-	-	-	-
16	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Kolon No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Örnek- L16 için uygulama

Uygulama Sonuçları

Stardart Sıra	A Hız	B Derinlik	C Çap	D İlerleme	Y Pürüzlülük
1	70	2	100	0.30	44
2	70	2	100	0.70	103
3	70	2	150	0.30	48
4	70	2	150	0.70	105
5	70	6	100	0.30	76
6	70	6	100	0.70	88
7	70	6	150	0.30	71
8	70	6	150	0.70	97
9	90	2	100	0.30	46
10	90	2	100	0.70	72
11	90	2	150	0.30	51
12	90	2	150	0.70	67
13	90	6	100	0.30	69
14	90	6	100	0.70	62
15	90	6	150	0.30	82
16	90	6	150	0.70	67

Üç seviyeli Ortogonal Matrisler

$L_9(3^4)$ orthogonal array

Experiment number	Column number			
	1	2	3	4
1	0	0	0	0
2	0	1	1	1
3	0	2	2	2
4	1	0	1	2
5	1	1	2	0
6	1	2	0	1
7	2	0	2	1
8	2	1	0	2
9	2	2	1	0
Basic mark	a	b	ab	ab^2

$L_{27}(3^{13})$ orthogonal array

Row number	Column number													Data
	1	2	3	4	5	6	7	8	9	10	11	12	13	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	1	1	1	1	1	1	1	1	1	
3	0	0	0	0	2	2	2	2	2	2	2	2	2	
4	0	1	1	1	0	0	0	1	1	1	2	2	2	
5	0	1	1	1	1	1	1	2	2	2	0	0	0	
6	0	1	1	1	2	2	2	0	0	0	1	1	1	
7	0	2	2	2	0	0	0	2	2	2	1	1	1	
8	0	2	2	2	1	1	1	0	0	0	2	2	2	
9	0	2	2	2	2	2	2	1	1	1	0	0	0	
10	1	0	1	2	0	1	2	0	1	2	0	1	2	
11	1	0	1	2	1	2	0	1	2	0	1	2	0	
12	1	0	1	2	2	0	1	2	0	1	2	0	1	
13	1	1	2	0	0	1	2	1	2	0	2	0	1	
14	1	1	2	0	1	2	0	2	0	1	0	1	2	
15	1	1	2	0	2	0	1	0	1	2	1	2	0	
16	1	2	0	1	0	1	2	2	0	1	1	2	0	
17	1	2	0	1	1	2	0	0	1	2	2	0	1	
18	1	2	0	1	2	0	1	1	2	0	0	1	2	
19	2	0	2	1	0	2	1	0	2	1	0	2	1	
20	2	0	2	1	1	0	2	1	0	2	1	0	2	
21	2	0	2	1	2	1	0	2	1	0	2	1	0	
22	2	1	0	2	0	2	1	1	0	2	2	1	0	
23	2	1	0	2	1	0	2	2	1	0	0	2	1	
24	2	1	0	2	2	1	0	0	2	1	1	0	2	
25	2	2	1	0	0	2	1	2	1	0	1	0	2	
26	2	2	1	0	1	0	2	0	2	1	2	1	0	
27	2	2	1	0	2	1	0	1	0	2	0	2	1	
Basic mark	a	b	ab	ab^2	c	ac	ac^2	bc	abc	ab^2c^2	bc^2	ab^2c	abc^2	
Assignment														

Karışık Matrislerden Örnekler

$L_{18}(2^1 \times 3^7)$

Experiment number	Column number							
	1	2	3	4	5	6	7	8
1	0	0	0	0	0	0	0	0
2	0	0	1	1	1	1	1	1
3	0	0	2	2	2	2	2	2
4	0	1	0	0	1	1	2	2
5	0	1	1	1	2	2	0	0
6	0	1	2	2	0	0	1	1
7	0	2	0	1	0	2	1	2
8	0	2	1	2	1	0	2	0
9	0	2	2	0	2	1	0	1
10	1	0	0	2	2	1	1	0
11	1	0	1	0	0	2	2	1
12	1	0	2	1	1	0	0	2
13	1	1	0	1	2	0	2	1
14	1	1	1	2	0	1	0	2
15	1	1	2	0	1	2	1	0
16	1	2	0	2	1	2	0	1
17	1	2	1	0	2	0	1	2
18	1	2	2	1	0	1	2	0

$L_{54}(2^1 \times 3^{25})$

Experiment number	Column number																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	2	1	2	1	2	1	2	1	2	1	2	1	2
5	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	0	2	0	2	0	2	0	2	0	2	0	2	0
6	0	0	1	1	1	1	1	1	1	2	2	2	2	2	0	1	0	1	0	1	0	1	0	1	0	1	0	1
7	0	0	2	2	2	2	2	2	0	0	0	0	0	0	2	1	2	1	2	1	2	1	2	1	2	1	2	1
8	0	0	2	2	2	2	2	2	1	1	1	1	1	1	0	2	0	2	0	2	0	2	0	2	0	2	0	2
9	0	0	2	2	2	2	2	2	2	2	2	2	2	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
10	0	1	0	0	1	1	2	2	0	0	1	2	2	0	0	0	0	0	1	2	1	2	2	1	2	1	2	1
11	0	1	0	0	1	1	2	2	1	2	2	0	0	1	1	1	1	2	0	2	0	0	0	2	0	1	2	1
12	0	1	0	0	1	1	2	2	2	2	0	0	1	1	2	2	2	2	0	1	0	1	1	0	1	0	1	0
13	0	1	1	1	2	2	0	0	0	0	1	1	2	2	1	2	1	2	2	1	2	1	2	1	2	1	2	1
14	0	1	1	1	2	2	0	0	1	1	2	2	0	0	2	0	2	0	0	2	0	2	1	1	1	1	1	1
15	0	1	1	1	2	2	0	0	2	2	0	0	1	1	0	1	0	1	1	0	1	1	0	2	2	2	2	2
16	0	1	2	2	0	0	1	1	0	0	1	1	2	2	2	1	2	1	0	0	0	0	1	2	1	2	1	2
17	0	1	2	2	0	0	1	1	1	1	2	2	0	0	0	2	0	2	1	1	1	1	2	0	2	0	2	0
18	0	1	2	2	0	0	1	1	2	2	0	0	1	1	1	2	1	0	2	2	2	2	0	1	0	1	0	1
19	0	2	0	1	0	2	1	2	0	1	0	2	1	2	0	0	1	2	0	0	2	1	1	2	2	2	2	1
20	0	2	0	1	0	2	1	2	1	2	1	0	2	0	1	1	2	0	1	1	0	2	2	0	0	1	2	1
21	0	2	0	1	0	2	1	2	2	0	2	1	0	1	2	2	0	1	2	2	1	0	0	1	1	0	1	0
22	0	2	1	2	1	0	2	0	1	0	2	1	2	2	1	2	2	1	1	2	0	0	2	1	0	0	1	0
23	0	2	1	2	1	0	2	0	1	2	1	0	2	0	2	0	0	2	2	0	1	1	0	2	1	0	1	0
24	0	2	1	2	1	0	2	0	2	0	2	1	0	1	0	1	1	0	0	1	2	2	1	0	2	1	1	1
25	0	2	2	0	2	1	0	1	0	1	0	2	1	2	2	1	0	0	2	1	1	2	0	0	1	1	1	1
26	0	2	2	0	2	1	0	1	1	2	1	0	2	0	0	2	1	1	0	2	2	0	1	1	2	0	1	0
27	0	2	2	0	2	1	0	1	2	0	2	1	0	1	1	0	2	2	1	0	0	1	2	2	0	1	2	0
28	1	0	0	2	2	1	1	0	0	2	2	1	1	0	0	0	2	1	2	1	1	2	1	2	0	0	0	0
29	1	0	0	2	2	1	1	0	1	0	2	2	1	1	1	0	2	0	2	0	2	2	0	2	0	1	1	1
30	1	0	0	2	2	1	1	0	2	1	1	0	0	2	2	2	1	0	1	0	0	1	0	1	0	1	2	2
31	1	0	1	0	0	1	2	1	0	2	2	1	1	0	1	2	0	0	0	0	2	1	2	1	1	1	2	2
32	1	0	1	0	0	1	2	1	1	0	0	2	2	1	2	0	1	1	1	1	0	2	0	2	2	0	2	0
33	1	0	1	0	0	1	2	1	2	1	1	0	0	2	0	1	2	2	2	2	1	0	1	0	0	0	1	0
34	1	0	2	1	1	0	0	2	0	2	2	1	1	0	2	1	1	2	1	2	0	0	0	0	0	2	1	1
35	1	0	2	1	1	0	0	2	1	0	0	2	2	1	0	2	2	0	2	0	1	1	1	1	1	0	2	2
36	1	0	2	1	1	0	0	2	2	1	1	0	0	2	1	0	0	2	0	1	2	2	1	2	1	2	1	0
37	1	1	0	1	2	0	2	1	0	1	2	0	2	1	0	0	1	2	2	1	0	0	1	1	1	1	2	2
38	1	1	0	1	2	0	2	1	1	2	0	1	0	2	1	1	2	0	0	1	1	1	0	0	2	2	0	0
39	1	1	0	1	2	0	2	1	2	0	1	2	1	0	2	2	2	0	1	1	0	2	2	1	0	0	1	1
40	1	1	1	2	0	1	0	2	0	1	2	0	2	1	1	2	2	1	0	0	1	2	0	0	2	1	0	0
41	1	1	1	2	0	1	0	2	1	2	0	1	0	2	2	0	0	2	1	1	2	0	1	1	0	2	1	0
42	1	1	1	2	0	1	0	2	2	0	1	2	1	0	0	1	1	0	2	2	0	1	2	2	1	2	1	0
43	1	1	2	0	1	2	1	0	0	1	2	0	2	1	2	1	0	0	1	2	2	1	1	2	0	0	0	0
44	1	1	2	0	1	2	1	0	1	2	0	1	0	2	0	2	1	1	2	0	0	2	2	0	1	1	1	1
45	1	1	2	0	1	2	1	0	2	0	1	2	1	0	1	0	2	2	0	1	1	0	0	1	2	2	1	2
46	1	2	0	2	1	2	0	1	0	2	1	2	0	1	0	0	2	1	1	2	2	1	0	0	1	2	2	2
47	1	2	0	2	1	2	0	1	1	0	2	0	1	2	1	1	0	2	2	0	0	2	1	1	2	0	1	1
48	1	2	0	2	1	2	0	1	2	1	0	1	2	0	2	2	1	0	0	1	1	0	2	2	0	1	1	1
49	1	2	1	0	2	0	1	2	0	2	1	2	0	1	1	2	0	0	2	1	0	0	1	2	2	1	1	1
50	1	2	1	0	2	0	1	2	1	0	2	0	1	2	2	0	1	1	0	2	1	1	2	0	0	2	2	2
51	1	2	1	0	2	0	1	2	2	1	0	1	2	0	0	1	1	2	1	0	2	2	0	1	1	0	1	0
52	1	2	2	1	0	1	2	0	0	2	1	2	0	1	2	1	1	2	0	0	1	2	2	1	0	0	0	0
53	1	2	2	1	0	1	2	0	1	0	2	0	1	2	0	2	2	0	1	1	2	0	0	2	1	1	1	1
54	1	2	2	1	0	1	2	0	2	1	0	1	2	0	1	0	0	1	2	2	0	1	1	0	2	2	1	2
Group	1	2	3					4																				