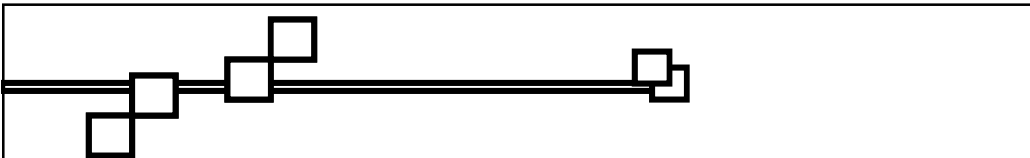


## Properties of Orthogonal Arrays


— — — — —

L8 Orthogonal Array



## Properties of Orthogonal Arrays

- Any two columns have all combinations equal number of times
- Balanced for each factor level
- Each factor level is balanced for any other factor



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### L8 Orthogonal Array

Expt No.	A	B	C	D	E	F	G
1	A1	B1	C1	D1	E1	F1	G1
2	A1	B1	C1	D2	E2	F2	G2
3	A1	B2	C2	D1	E1	F2	G2
4	A2	B2	C2	D2	E2	F1	G1
5	A2	B1	C2	D1	E2	F1	G2
6	A2	B1	C2	D2	E1	F2	G1
7	A2	B2	C1	D1	E2	F2	G1
8	A2	B2	C1	D2	E1	F1	G2

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### L8 Orthogonal Array

Any two columns have all combinations equal number of times

Expt No.	A	B	C	D	E	F	G
1	A1	B1					
2	A1	B1					
3	A1	B2					
4	A1	B2					
5	A2	B1					
6	A2	B1					
7	A2	B2					
8	A2	B2					

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**L8 Orthogonal Array**  
Any two columns have all combinations equal number of times

Expt No.	A	B	C	D	E	F	G
1			<b>C1</b>		<b>E1</b>		
2			C1		E2		
3			<i>C2</i>		<i>E1</i>		
4			<b>C2</b>		<b>E2</b>		
5			C2		E2		
6			<i>C2</i>		<i>E1</i>		
7			C1		E2		
8			<i>C1</i>		<i>E1</i>		

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**OA Properties - 5**

**L8 Orthogonal Array**  
Balanced for each factor level, say **A**

Expt No.	A	B	C	D	E	F	G
1	<b>A1</b>						
2	A1						
3	A1						
4	A1						
5	<b>A2</b>						
6	A2						
7	A2						
8	A2						

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**OA Properties - 6**

**L8 Orthogonal Array**  
Balanced for each factor level, say **D**

Expt No.	A	B	C	D	E	F	G
1				D1			
2				D2			
3				D1			
4				D2			
5				D1			
6				D2			
7				D1			
8				D2			

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**OA Properties - 7**

**L8 Orthogonal Array**  
Balanced for each factor level, say **D**

Expt No.	A	B	C	D	E	F	G
1				D1			
2							
3				D1			
4							
5				D1			
6							
7				D1			
8							

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**OA Properties - 8**

**L8 Orthogonal Array**  
Balanced for each factor level, say **D**

Expt No.	A	B	C	D	E	F	G
1							
2				D2			
3							
4				D2			
5							
6				D2			
7							
8				D2			

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**OA Properties - 9**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1	A1			D1			
2	A1			D2			
3	A1			D1			
4	A1			D2			
5	A2			D1			
6	A2			D2			
7	A2			D1			
8	A2			D2			

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**OA Properties - 10**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1	A1			D1			
2	A1			D2			
3	A1			D1			
4	A1			D2			
5							
6							
7							
8							

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**OA Properties - 11**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1							
2							
3							
4							
5	A2			D1			
6	A2			D2			
7	A2			D1			
8	A2			D2			

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**OA Properties - 12**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1			C1			F1	
2			C1			F2	
3			C2			F2	
4			C2			F1	
5			C2			F1	
6			C2			F2	
7			C1			F2	
8			C1			F1	

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**OA Properties - 13**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1			C1			F1	
2			C1			F2	
3							
4							
5							
6							
7			C1			F2	
8			C1			F1	

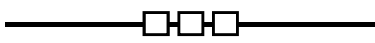
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**OA Properties - 14**

**L8 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D	E	F	G
1							
2							
3			<i>C2</i>			<i>F2</i>	
4			<i>C2</i>			<i>F1</i>	
5			<i>C2</i>			<i>F1</i>	
6			<i>C2</i>			<i>F2</i>	
7							
8							

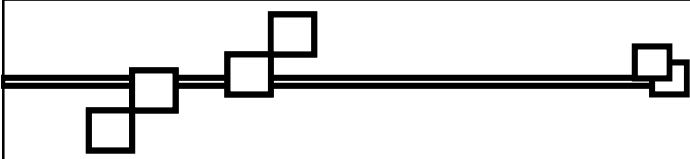
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**OA Properties - 15**

**Properties of Orthogonal Arrays**




**L9 Orthogonal Array**



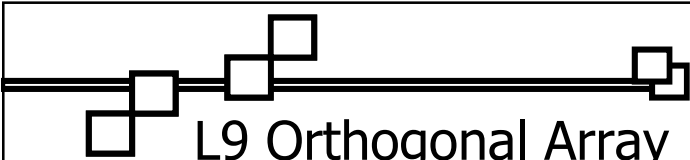


## Properties of Orthogonal Arrays

- Any two columns have all combinations equal number of times
- Balanced for each factor level
- Each factor level is balanced for any other factor




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## L9 Orthogonal Array

Expt No.	A	B	C	D
1	A1	B1	C1	D1
2	A1	B2	C2	D2
3	A1	B3	C3	D3
4	A2	B1	C2	D3
5	A2	B2	C3	D1
6	A2	B3	C1	D2
7	A3	B1	C3	D2
8	A3	B2	C1	D3
9	A3	B3	C2	D1




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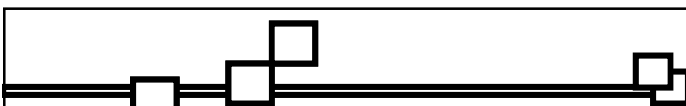
## L9 Orthogonal Array

Any two columns have all combinations equal number of times

Expt No.	A	B	C	D
1	A1	B1		
2	A1	B2		
3	A1	B3		
4	A2	B1		
5	A2	B2		
6	A2	B3		
7	A3	B1		
8	A3	B2		
9	A3	B3		




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**OA Properties - 19**



## L9 Orthogonal Array

Any two columns have all combinations equal number of times

Expt No.	A	B	C	D
1	A1	B1		
2	A1	B2		
3	A1	B3		
4	A2	B1		
5	A2	B2		
6	A2	B3		
7	A3	B1		
8	A3	B2		
9	A3	B3		



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**OA Properties - 20**

**L9 Orthogonal Array**  
Balanced for each factor level


Expt No.	A	B	C	D
1	A1	B1	C1	D1
2	A1	B2	C2	D2
3	A1	B3	C3	D3
4	A2	B1	C2	D3
5	A2	B2	C3	D1
6	A2	B3	C1	D2
7	A3	B1	C3	D2
8	A3	B2	C1	D3
9	A3	B3	C2	D1

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**OA Properties - 21**

**L9 Orthogonal Array**  
Balanced for each factor level (occurs exactly 3 times)

Expt No.	A	B	C	D
1		B1		
2		B2		
3		B3		
4		B1		
5		B2		
6		B3		
7		B1		
8		B2		
9		B3		


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**OA Properties - 22**



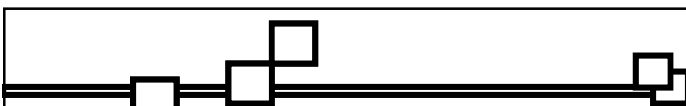
## L9 Orthogonal Array

Balanced for each factor level (occurs exactly 3 times)

Expt No.	A	B	C	D
1				<b>D1</b>
2				<b>D2</b>
3				D3
4				D3
5				<b>D1</b>
6				<b>D2</b>
7				<b>D2</b>
8				D3
9				<b>D1</b>




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**OA Properties - 23**



## L9 Orthogonal Array

Balanced for each factor level (occurs exactly 3 times)

Expt No.	A	B	C	D
1				<b>D1</b>
2				<b>D2</b>
3				D3
4				D3
5				<b>D1</b>
6				<b>D2</b>
7				<b>D2</b>
8				D3
9				<b>D1</b>



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**OA Properties - 24**

**L9 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D
1		B1		D1
2		B2		D2
3		B3		D3
4		B1		D3
5		B2		D1
6		B3		D2
7		B1		D2
8		B2		D3
9		B3		D1

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**OA Properties - 25**

**L9 Orthogonal Array**  
Each factor level is balanced for any other factor

Expt No.	A	B	C	D
1		B1		D1
2		<i>B2</i>		<i>D2</i>
3		B3		D3
4		B1		D3
5		<i>B2</i>		<i>D1</i>
6		B3		D2
7		B1		D2
8		<i>B2</i>		<i>D3</i>
9		B3		D1

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**OA Properties - 26**

