

# Fractional Factorial Design

## Reactor Example i BHH kap. 12

Factors: 5 Base Design: 5; 16 Resolution: V  
Runs: 16 Replicates: 1 Fraction: 1/2  
Blocks: 1 Center pts (total): 0

Design Generators: E = ABCD

Defining Relation: I = ABCDE

### Alias Structure

I + ABCDE

A + BCDE

B + ACDE

C + ABDE

D + ABCE

E + ABCD

AB + CDE

AC + BDE

AD + BCE

AE + BCD

BC + ADE

BD + ACE

BE + ACD

CD + ABE

CE + ABD

DE + ABC

### Data Display

Row	A	B	C	D	E	Y
1	-1	-1	-1	-1	1	56
2	1	-1	-1	-1	-1	53
3	-1	1	-1	-1	-1	63
4	1	1	-1	-1	1	65
5	-1	-1	1	-1	-1	53
6	1	-1	1	-1	1	55
7	-1	1	1	-1	1	67
8	1	1	1	-1	-1	61
9	-1	-1	-1	1	-1	69
10	1	-1	-1	1	1	45
11	-1	1	-1	1	1	78
12	1	1	-1	1	-1	93
13	-1	-1	1	1	1	49
14	1	-1	1	1	-1	60
15	-1	1	1	1	-1	95
16	1	1	1	1	1	82

## Factorial Fit: Y versus A; B; C; D; E

Estimated Effects and Coefficients for Y (coded units)

Term	Effect	Coef	"Fasit" fra fullt forsøk
Constant		65,250	65,5
A	-2,000	-1,000	-1,375
B	20,500	10,250	19,5
C	0,000	0,000	-0,625
D	12,250	6,125	10,75
E	-6,250	-3,125	-6,25
A*B	1,500	0,750	1,375
A*C	0,500	0,250	0,75
A*D	-0,750	-0,375	0,875
A*E	1,250	0,625	0,125
B*C	1,500	0,750	0,875
B*D	10,750	5,375	13,25
B*E	1,250	0,625	2,0
C*D	0,250	0,125	2,125
C*E	2,250	1,125	0,875
D*E	-9,500	-4,750	-11,0

S = \*

Analysis of Variance for Y (coded units)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Main Effects	5	2453,5	2453,5	490,70	*	*
2-Way Interactions	10	877,5	877,5	87,75	*	*
Residual Error	0	*	*	*		
Total	15	3331,0				

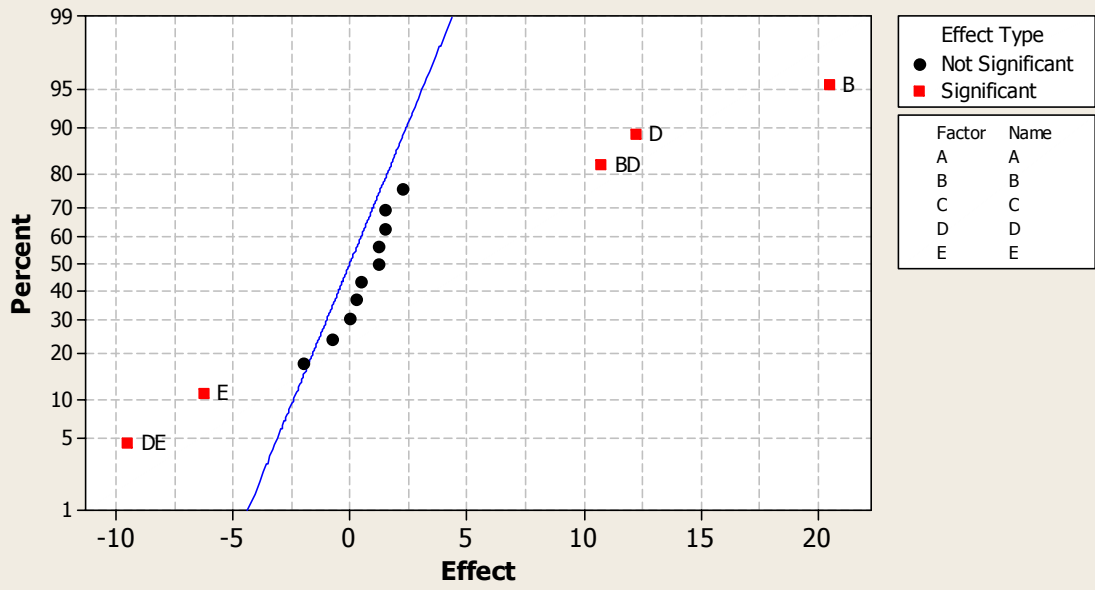
## Effects Plot for Y

Alias Structure

I + A\*B\*C\*D\*E  
A + B\*C\*D\*E  
B + A\*C\*D\*E  
C + A\*B\*D\*E  
D + A\*B\*C\*E  
E + A\*B\*C\*D  
A\*B + C\*D\*E  
A\*C + B\*D\*E  
A\*D + B\*C\*E  
A\*E + B\*C\*D  
B\*C + A\*D\*E  
B\*D + A\*C\*E  
B\*E + A\*C\*D  
C\*D + A\*B\*E  
C\*E + A\*B\*D  
D\*E + A\*B\*C

### Normal Probability Plot of the Effects

(response is Y, Alpha = ,05)



Lenth's PSE = 1,875