me270hw7 DOE

slide

question

1 optimization

Assuming only knowing the following DOE results, if your goal was to maximize the output level (while minimizing noise), what would you recommend as the setting for the input?

Test	x_1	x_2	x_1x_2
1	-1	-1	1
2	-1	1	-1
3	1	-1	-1
4	1	1	1
Main	E_1	E_2	E_{12}
	5.00	-0.88	0.66
Noise	E_1	E_2	E_{12}
	-0.089	-0.675	0.052

Main (5.00)(-0.88)(0.66)
Noise (-0.089)(-0.675)(0.052)

reduce the significance of E2 by x2 you need to increase its input
x2 = high (inverse relationship)

x1 is high as its a positive relationship

Answer
Variable 1 set to high, variable 2 set to high

2Garden

You want to optimize the growing conditions for your favorite flower. You vary the following:

variable 1 is amount of miracle grow (low is 4 oz, high is 7 oz),
variable 2 is moisture added each day (low is 6 ml, high is 14 ml),
variable 3 is UV LED intensity (low is 5 watt, high is 20 watt).
'Y' values are mm growth in a week. Give all answer to the tenths place - e.g. 21.3.

How many seeds (i.e. experiments) will you need to run these tests?

Test	x1	x2	x3	y1	y2
1	-1	-1	-1	17.9	17.6
2	-1	-1	1	20.3	20.2
3	-1	1	-1	15	14.8
4	-1	1	1	18	17.3
5	1	-1	-1	17.5	17.7
6	1	-1	1	21.5	20.9
7	1	1	-1	24.2	23.1
8	1	1	1	27.6	28.2

C*2^n = 16*

22^3

n = number of variables

(x1,x2,x3)

C = how many test case (y1,y2,y3...)

Answer

2x2^3 =16

3

Main Effects:

E_1 = 4.95

E_2 = 1.83

E_3 = 3.28

$E_{1,2}$ = 4.55

$E_{1,3}$ = 0.65

$E_{2,3}$ = 0.23

$E_{1,2,3}$ = 0.1

4

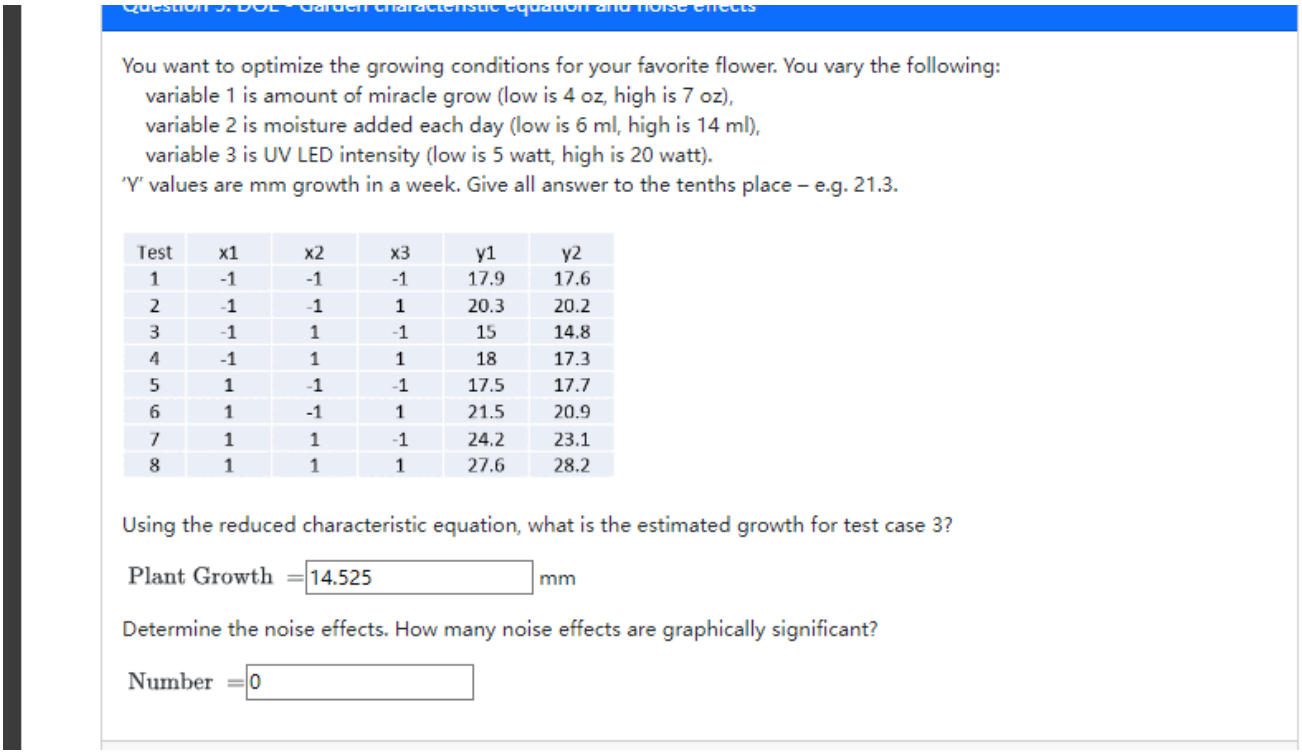
What is the system standard deviation?

σ = 0.4

How many main effects are statistically significant?

4(大于二倍的\sigma)

5



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Using the reduced characteristic equation, what is the estimated growth for test case 3?

Plant Growth = 14.525 mm

Determine the noise effects. How many noise effects are graphically significant?

Number = 0

Using the reduced characteristic equation, what is the estimated growth for test case 3?
mm
Determine the noise effects. How many noise effects are graphically significant?

plant Growth = 14.6
y = y ave + (sig effect) /2 * variable (-1 / 1)
y = 20 + (-1 **4.95/2)+(1** 1.83/2) + (-1**3.28/2)+(-1**4.55/2) = 14.525

0 (graph it mentally)

5

What is your recommended setting to achieve the best growth conditions with the greatest consistency? (answer should be numeric between -1 and 1)