

SIE 330R Homework, Spring 2023

HW 9 (Chapter 8)

Homework must be readable! Do not just send in numbers or charts. You must explain the homework answers Preferred to receive homework in Word doc format with any excel or Minitab results pasted into word document. You may choose to use pdf which is also OK.

Put answers to all questions in one document NOT in separate documents

- Homework 9 Chapter 8, Prob 8.1, 8.2, 8.A, 8.B

8.1. Suppose that in the chemical process development experiment in Problem 6.11, it was only possible to run a one-half fraction of the 2^4 design. Construct the design and perform the statistical analysis, using the data from replicate 1.

6.11. An experiment was performed to improve the yield of a chemical process. Four factors were selected, and two replicates of a completely randomized experiment were run. The results are shown in the following table:

Treatment Combination	Replicate I	Replicate II	Treatment Combination	Replicate I	Replicate II
(1)	90	93	<i>d</i>	98	95
<i>a</i>	74	78	<i>ad</i>	72	76
<i>b</i>	81	85	<i>bd</i>	87	83
<i>ab</i>	83	80	<i>abd</i>	85	86
<i>c</i>	77	78	<i>cd</i>	99	90
<i>ac</i>	81	80	<i>acd</i>	79	75
<i>bc</i>	88	82	<i>bcd</i>	87	84
<i>abc</i>	73	70	<i>abcd</i>	80	80

8.2S. Consider the plasma etch experiment described in Example 6.1. Suppose that only a one-half fraction of the design could be run. See below for fractional experiment setup. Analyze the data.

A	B	C	Etch Rate
-1	-1	-1	550
-1	-1	-1	604
-1	-1	1	1037
-1	-1	1	1052
-1	1	-1	633
-1	1	-1	601
-1	1	1	1075
-1	1	1	1063
1	-1	-1	669
1	-1	-1	650
1	-1	1	749
1	-1	1	868
1	1	-1	642
1	1	-1	635
1	1	1	729
1	1	1	860

8A: A experiment is to be run on 8 Factors. Only 64 experimental units are available for the experiment.

What Fraction will this experiment be?

What is the highest Resolution for this experiment?

Will any Main Effects be confounded with 2-way or 3-way interactions?

Will any 2 way interactions be confounded with 3-way interactions?

8B: A experiment is to be run on 7 Factors. Only 16 experimental units are available for the experiment.

What Fraction will this experiment be?

What is the highest Resolution for this experiment?

Will any Main Effects be confounded with 2-way or 3-way interactions?

Will any 2 way interactions be confounded with 3-way interactions?