

Statistics 506
Test 2

1. An experimenter studied 6 factors in 16 runs by initially assigning E to ABCD and F to ABD. Write down the design generator for this experiment and find the entire alias structure (by hand). Is this a good design? Why or why not? After consulting with a statistician, a different design was chosen (E=ABC, F=ABD) and run with the results reproduced in the table below. Analyze the data.

A	B	C	D	E	F	Response
-1	-1	-1	-1	-1	-1	26.9
1	-1	-1	-1	1	1	23.9
-1	1	-1	-1	1	1	21.9
1	1	-1	-1	-1	-1	38.9
-1	-1	1	-1	1	-1	24.1
1	-1	1	-1	-1	1	24.6
-1	1	1	-1	-1	1	20.6
1	1	1	-1	1	-1	41.8
-1	-1	-1	1	-1	1	24.9
1	-1	-1	1	1	-1	29.2
-1	1	-1	1	1	-1	21.8
1	1	-1	1	-1	1	39.7
-1	-1	1	1	1	1	28.9
1	-1	1	1	-1	-1	28.2
-1	1	1	1	-1	-1	25.0
1	1	1	1	1	1	40.3

2. A 3-factor design was replicated twice. Results appear in the table below.

A	B	C	Responses
-1	-1	-1	19.7,17.9
1	-1	-1	19.7,18.9
-1	1	-1	20.2,16.7
1	1	-1	20.1,21.0
-1	-1	1	20.4,20.3
1	-1	1	19.9,18.7
-1	1	1	20.7,21.9
1	1	1	20.7,20.1

- (a) Compute cell variances and MSPE. Compare hand calculations of T statistics to Minitab's T statistics. Which effects are significant?
- (b) Compute the sample size needed to detect effects of size .5 to 2 in increments of .1 with 95% confidence. Plot the results. Use the plot to estimate the effect size that could be detected with 5 replications.