Minitab Tutorial for Randomized Block Designs

With blocking design we will always assume there is no BLOCK by TREATMENT interactions in our models [this is the assumption of additivity]. There are several ways to check this assumption, but we will rely on a graphical evaluation. We create an interaction plot [profile plot] for block and treatment and check to see if the lines are approximately parallel. Ideally the lines would be perfectly parallel under the assumption of additivity, but as the data are random we would not expect perfect parallelism. The methods for creating the graphs for the different blocking designs are listed below

Data saved on U drive

### RBD (1 independent variable & 1 blocking variable)

Enter data as you would with a factorial design. Place each variable in a separate column and type in the category number.

Test of Additivity Assumption
To test for addivitiy, you need to create an interaction plot.

1. Stat – ANOVA – Interaction plots

2. Select the response variable, **detection** and the categorical variables, **clutter** and **operator.** It may be helpful to select "show all interactions matrix."

3. Select OK
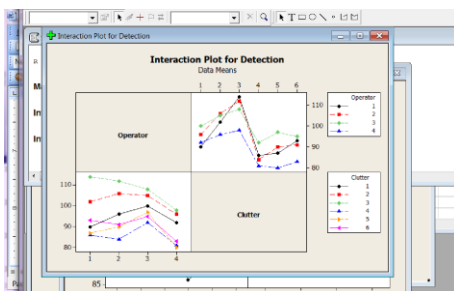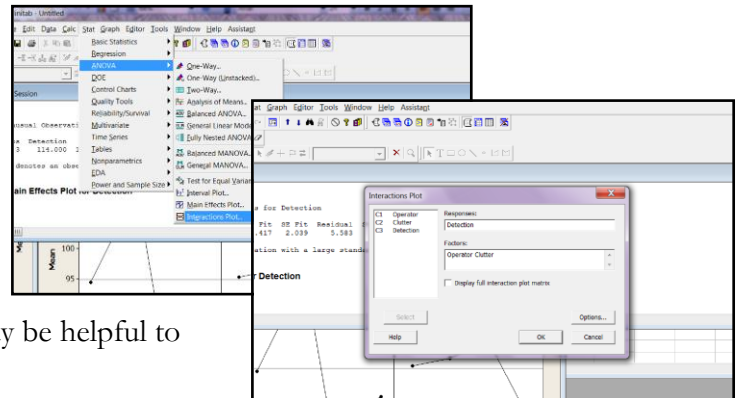
Interpreting the graphs: The lines on the graph look approximately parallel so our assumption of additivity appears to be valid and we may continue with the analysis. We would only reject the assumption of additivity if there were dramatic evidence that the assumption was incorrect.
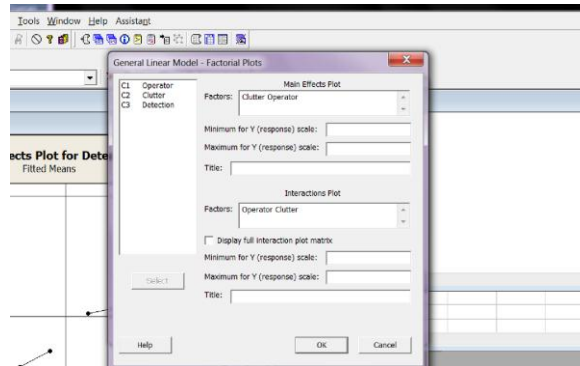
Analysis of RB – a

1. Stat – ANOVA – General Linear Model
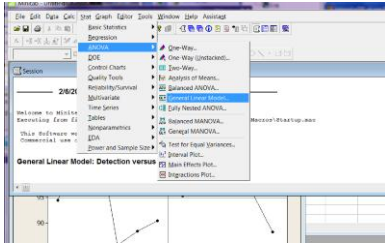
2. Select response variable, **detection,** and factor and block, **operator** and **clutter**

3. You can also ask for **Factor Plots.** You can select individual plots for the factor and block as well as an interaction plot to test the *additivity assumption*

4. Select OK

Analyze output as before.


```
Factor     Type    Levels  Values
Operator   fixed       4   1, 2, 3, 4
Clutter    fixed       6   1, 2, 3, 4, 5, 6


Analysis of Variance for Detection, using Adjusted SS for Tests

Source      DF    Seq SS    Adj SS   Adj MS      F      P
Operator     3    402.17    402.17   134.06  12.09  0.000
Clutter      5   1479.33   1479.33   295.87  26.68  0.000
Error       15    166.33    166.33    11.09
Total       23   2047.83
```

8	2	2	106
9	2	3	112
10	2	4	84