

Analysis of Split-plots (JMP v. 15)

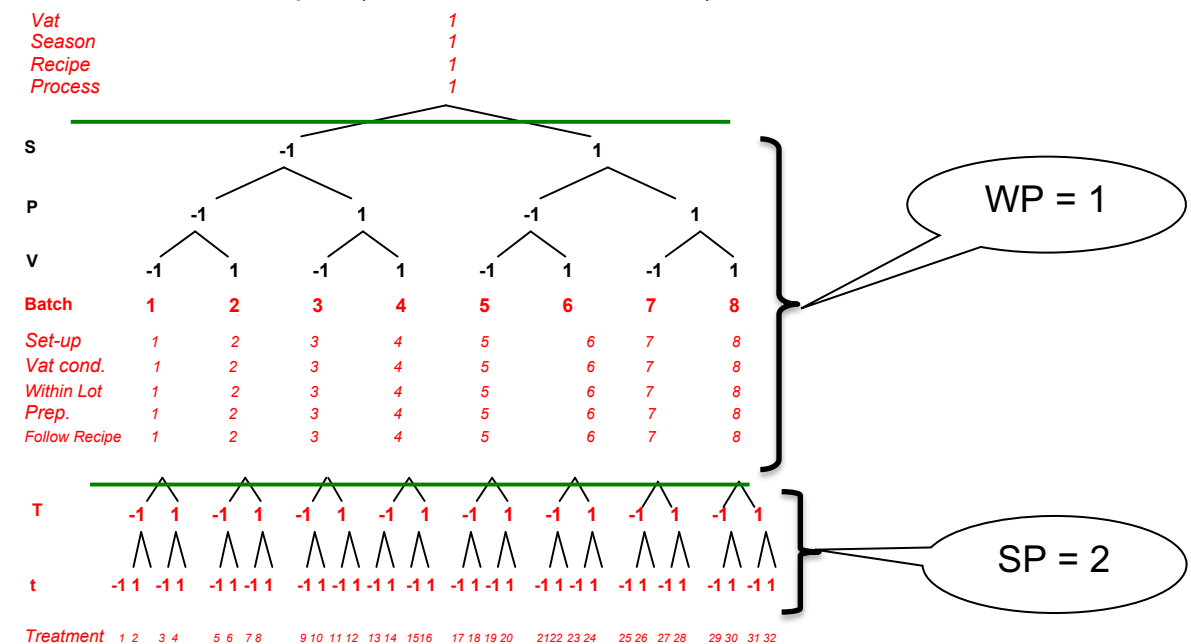
Many industrial experiments are run without complete randomization (factors may be difficult to change, circumstances don't allow for, there is a desire to economize or a desire to partition the **Noise**). This restriction on randomization needs to be accounted for in the analysis. Make sure the restrictions (an appropriate assignment of **noise**) are noted on your experiment plan (FRD). Assign the partitioned degrees of freedom to the FRD.

To perform the analysis, start with your typical analysis by entering a saturated model and run the fit model platform (**Analyze>Fit Model**). Using the output, right click on **Parameter Estimates** section and **Make into Data Table**.

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	3.446875	.	.	.
S	1.334375	.	.	.
P	-0.165625	.	.	.
S*P	0.096875	.	.	.
V	0.603125	.	.	.
S*V	0.103125	.	.	.
P*V	0.065625	.	.	.
S*P*V	0.140625	.	.	.
T	0.553125	.	.	.
S*T	0.153125	.	.	.
P*T	-0.459375	.	.	.
S*P*T	-0.084375	.	.	.
V*T	-0.015625	.	.	.
S*V*T	-0.128125	.	.	.
P*V*T	0.071875	.	.	.
S*P*V*T	0.184375	.	.	.
t	0.265625	.	.	.
S*t	0.003125	.	.	.
P*t	-0.109375	.	.	.
S*P*t	0.003125	.	.	.
V*t	-0.040625	.	.	.
S*V*t	-0.040625	.	.	.
P*V*t	0.009375	.	.	.
S*P*V*t	0.034375	.	.	.
T*t	0.034375	.	.	.
S*T*t	-0.040625	.	.	.
P*T*t	-0.040625	.	.	.

- Table Style
- Columns
- Sort by Column...
- Make into Data Table
- Make Combined Data Table
- Make Into Matrix
- Format Column...

Delete the first row (Intercept). Rename the **Std Error** column **Plot** and assign the terms to the correct plot (WP=1, SP₁=2, SP₂=3...) as identified on the FRD.



Also rename the **t Ratio** column **ABS** (absolute value of the estimates column). Right click on the column **ABS** and create a formula for the absolute value of the estimate column (**Numeric**→**Abs**→double click on **Estimate**).

The screenshot shows the JMP Pro interface. On the right, a data table with 31 rows and 4 columns: Term, Estimate, Plot, and ABS. The ABS column is highlighted. On the left, the 'Columns' window shows the formula for the ABS column: `Abs[Estimate]`. The 'Estimate' column is also highlighted in the data table.

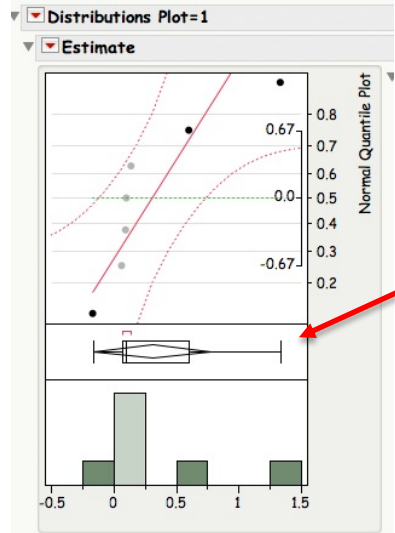
	Term	Estimate	Plot	ABS
1	S	1.334375	1	1.33
2	P	-0.165625	1	0.17
3	S*P	0.096875	1	0.10
4	V	0.603125	1	0.60
5	S*V	0.103125	1	0.10
6	P*V	0.065625	1	0.07
7	S*P*V	0.140625	1	0.14
8	T	0.553125	2	0.55
9	S*T	0.153125	2	0.15
10	P*T	-0.459375	2	0.46
11	S*P*T	-0.084375	2	0.08
12	V*T	-0.015625	2	0.02
13	S*V*T	-0.128125	2	0.13
14	P*V*T	0.071875	2	0.07
15	S*P*V*T	0.184375	2	0.18
16	t	0.265625	2	0.27
17	S*t	0.003125	2	0.00
18	P*t	-0.109375	2	0.11
19	S*P*t	0.003125	2	0.00
20	V*t	-0.040625	2	0.04
21	S*V*t	-0.040625	2	0.04
22	P*V*t	0.009375	2	0.01
23	S*P*V*t	0.034375	2	0.03
24	T*t	0.034375	2	0.03
25	S*T*t	-0.040625	2	0.04
26	P*T*t	-0.040625	2	0.04
27	S*P*T*t	0.109375	2	0.11
28	V*T*t	-0.121875	2	0.12
29	S*V*T*t	0.040625	2	0.04
30	P*V*T*t	0.003125	2	0.00
31	S*P*V*T*t	-0.009375	2	0.01

Make sure the Term column has a label symbol next to it. If it does not, right click on the column **Term** and select **Label/unlabel**.

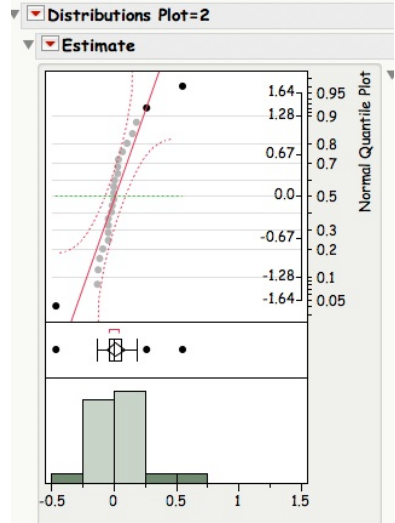
Create normal plots for the Estimate: **Analyze**→**Distribution**. Put Estimate in the **Y, Column** window and **Plot** in the **By** window and select OK.

The screenshot shows the 'Distribution' dialog box in JMP. The 'Y, Columns' field contains 'Estimate' and the 'By' field contains 'Plot'. Red arrows point to these fields. The 'Action' buttons (OK, Cancel, Remove, Recall, Help) are visible on the right.

This will provide normal plots for each plot (Whole plot and sub plot) on your FRD. You can add **Quantile** plots to assist in the interpretation.



1/3/11 8:52 AM
Data Table=Plot=2, Linked Subset=This subset is linked to mntitled 3, Plot=2



Next create Pareto plots for practical significance: **Analyze**→**Quality and Process**→**Pareto Plot**: Place **Term** in the **Y, Cause** box, **ABS** in the **Weight** box and **Plot** in the **By** box.

The Pareto Chart of Cause, optionally grouped by X

Select Columns	Cast Selected Columns into Roles	Action
<input checked="" type="checkbox"/> Term <input checked="" type="checkbox"/> Estimate <input checked="" type="checkbox"/> Plot <input checked="" type="checkbox"/> ABS	Y, Cause: Term X, Grouping: optional Weight: ABS Freq: optional numeric By: Plot optional	<input type="button" value="OK"/> <input type="button" value="Cancel"/> <input type="button" value="Remove"/> <input type="button" value="Recall"/> <input type="button" value="Help"/>

Threshold of Combined Causes
 Per Unit Analysis (requires sample size)

