

# Full Factorial

Full Factorial - JMP Pro

4/0	9/0	Pattern	X1	X2	X3
●	1	---	-1	-1	-1
●	2	--+	-1	-1	1
●	3	-+-	-1	1	-1
●	4	-++	-1	1	1
●	5	+--	1	-1	-1
●	6	+-+	1	-1	1
●	7	++-	1	1	-1
●	8	+++	1	1	1
●	9	000	0	0	0

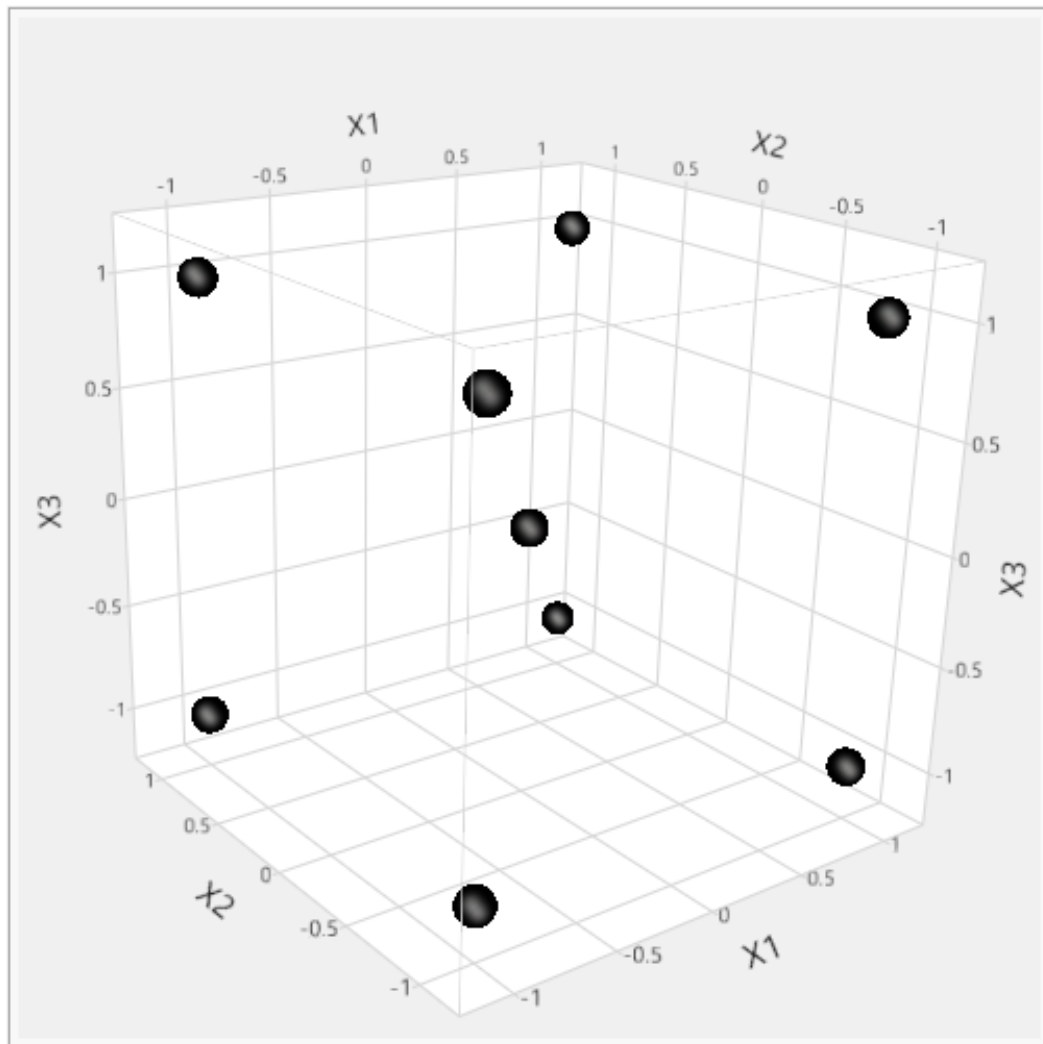
# Fractional Factorial

Fractional Fractional - JMP Pro

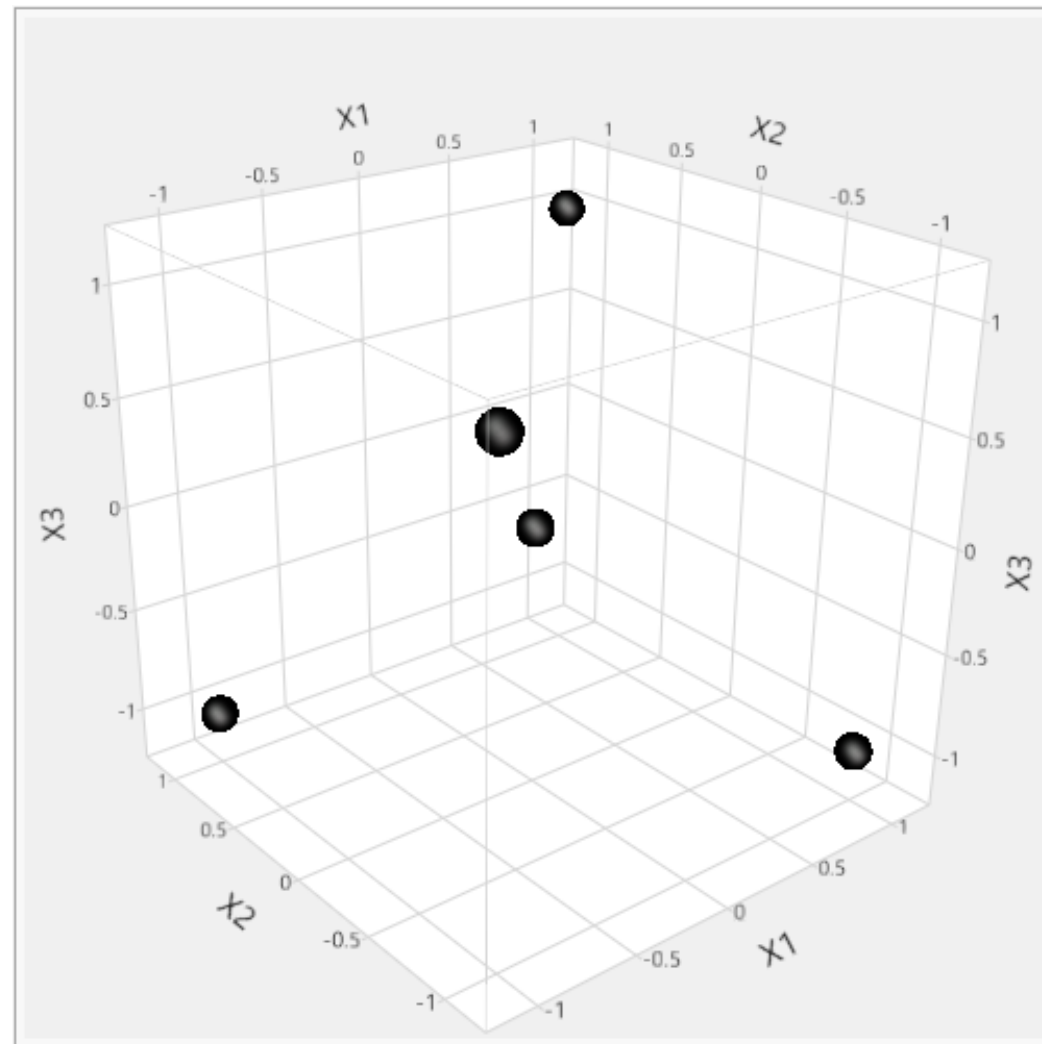
4/0	5/0	Pattern	X1	X2	X3
●	1	--+	-1	-1	1
●	2	-+-	-1	1	-1
●	3	+--	1	-1	-1
●	4	+++	1	1	1
●	5	000	0	0	0

evaluations done

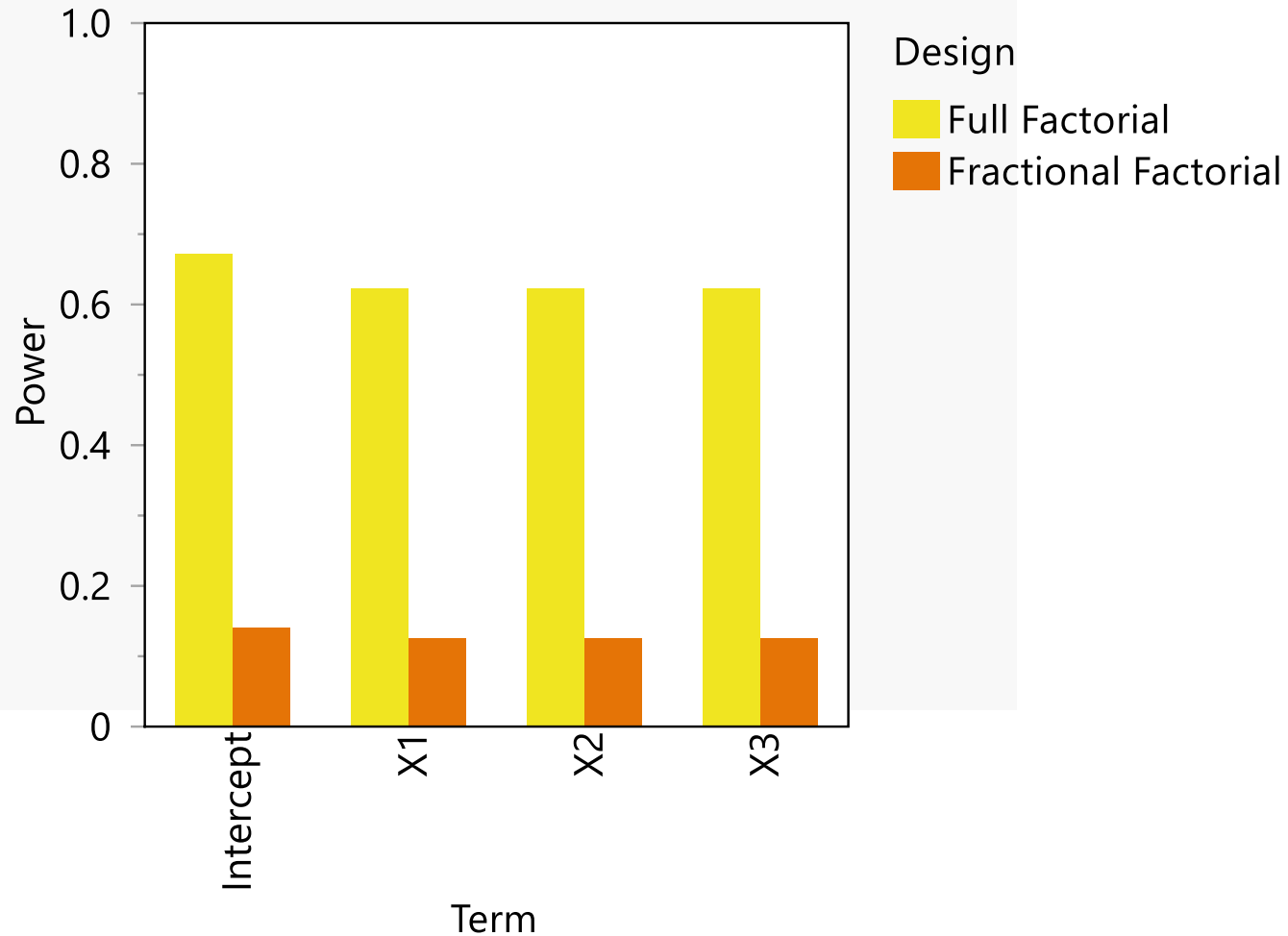
# Full Factorial



# Fractional Factorial



## Power Plot



Main effects power is very low for the Fractional Factorial

Power = 0.1 means you would expect 10% of experiments to detect the factor effect as significant

But...

Significance Level 0.05

Anticipated RMSE 1

Term	Anticipated Coefficient	Full Factorial Power	Fractional Factorial Power
Intercept	1	0.672	0.140
X1	1	0.623	0.126
X2	1	0.623	0.126
X3	1	0.623	0.126

...power is dependent on **your** estimates of signal and noise

You need to state the size of the effect “signal” you want to detect

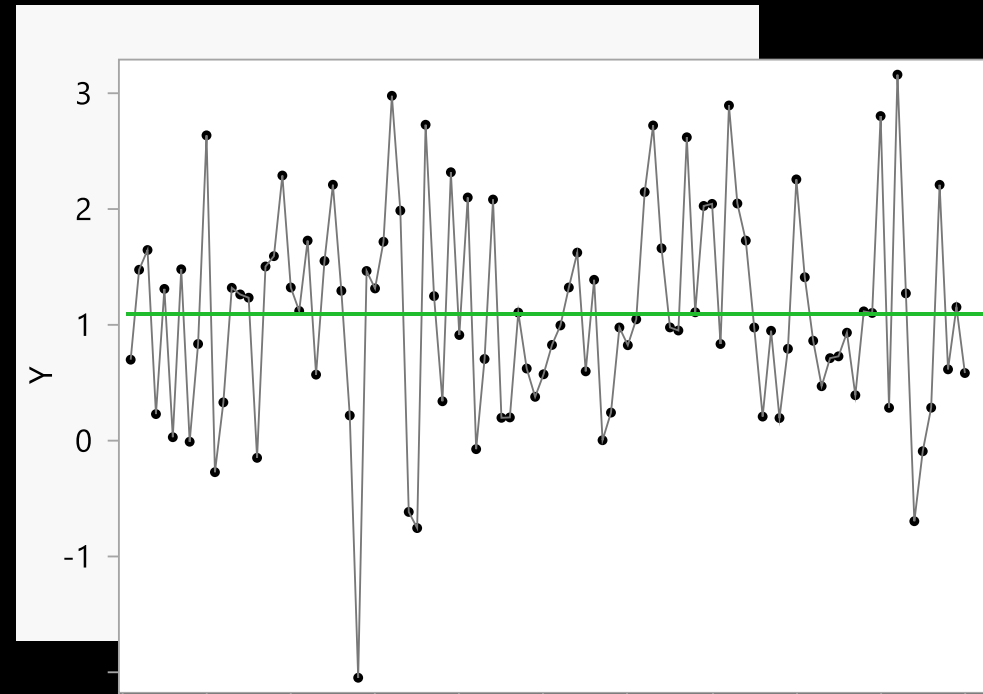
And the uncontrolled “noise” that you expect

# Anticipated RMSE 1

RMSE is your estimate of “noise”

RMSE = 1 means you expect a standard deviation of 1 for the response,  $Y$ , for many repeated runs at the same factor settings

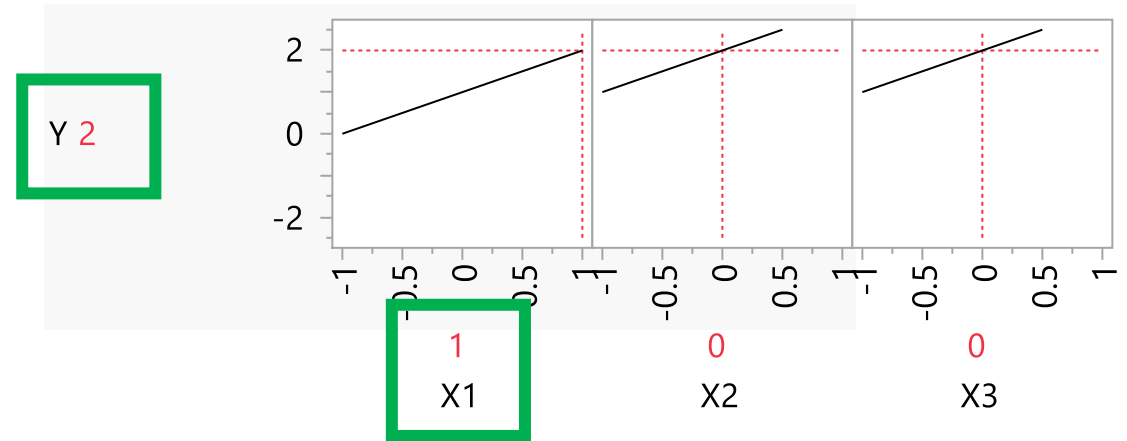
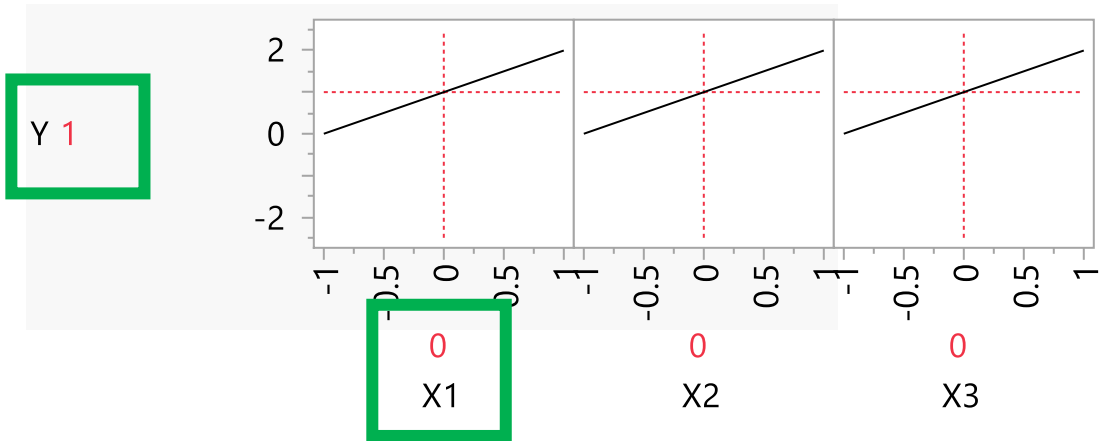
	X1	X2	X3	Y
1	0	0	0	0.69475513
2	0	0	0	1.47194685
3	0	0	0	1.6426803
4	0	0	0	0.22457522
5	0	0	0	1.30666632
6	0	0	0	0.02471354
7	0	0	0	1.4761675
8	0	0	0	-0.014499
9	0	0	0	0.83053764
10	0	0	0	2.63370562
11	0	0	0	-0.277598



Term	Anticipated Coefficient
Intercept	1
X1	1
X2	1
X3	1

Anticipated Coefficient is the size of effect “signal” that you want to detect

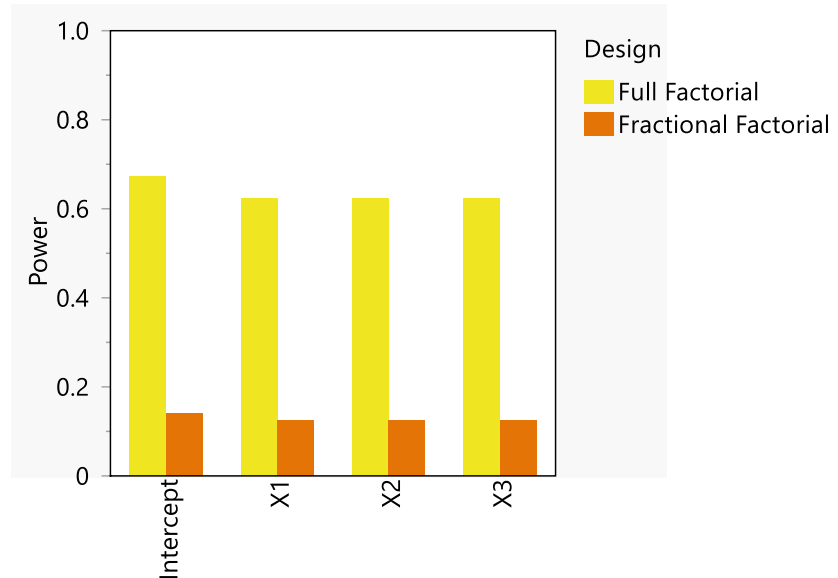
Coefficient = 1 means the response, Y, will increase by 1 unit when the factor is changed from the mid point to the upper range limit



Significance Level 0.05

Anticipated RMSE 1

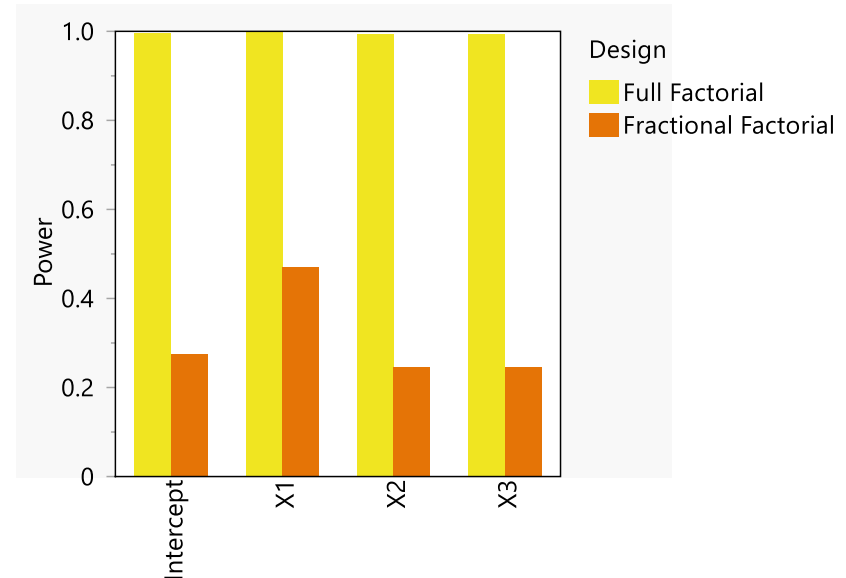
Term	Anticipated Coefficient	Full Factorial Power	Fractional Factorial Power
Intercept	1	0.672	0.140
X1	1	0.623	0.126
X2	1	0.623	0.126
X3	1	0.623	0.126



Significance Level 0.05

Anticipated RMSE 0.5

Term	Anticipated Coefficient	Full Factorial Power	Fractional Factorial Power
Intercept	1	0.997	0.274
X1	2	1.000	0.470
X2	1	0.993	0.246
X3	1	0.993	0.246



Different estimates of signal and noise will change the power



**#DoEbyPhilKay**