JMP Polynomial Regression for Reaction Rate

Response ReactRate

Explanatory C1 and C2 (coded)

Summary of Fit

RSquare	0.75052
RSquare Adj	0.70894
Root Mean Square Error	2
Mean of Response	7.2
Observations (or Sum Wgts)	15

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	144.40000	72.2000	18.0500
Error	12	48.00000	4.0000	Prob > F
C. Total	14	192.40000		0.0002

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.2	0.516398	13.94	<.0001
C1	3.7	0.632456	5.85	<.0001
C2	0.5	0.365148	1.37	0.1960

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
C1	1	1	136.90000	34.2250	<.0001
C2	1	1	7.50000	1.8750	0.1960

The t Tests for the parameter estimates indicate that the linear component (C1) is statistically significant but that the quadratic component (C2) is not.

Response ReactRate

Explanatory Temp and Temp^2

Summary of Fit

RSquare	0.75052
RSquare Adj	0.70894
Root Mean Square Error	2
Mean of Response	7.2
Observations (or Sum Wgts)	15

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	144.40000	72.2000	18.0500
Error	12	48.00000	4.0000	Prob > F
C. Total	14	192.40000		0.0002

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	15.4	16.99412	0.91	0.3827
Temp	-0.332	0.351454	-0.94	0.3635
Temp*Temp	0.0024	0.001753	1.37	0.1960

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Temp	1	1	3.5694301	0.8924	0.3635
Temp*Temp	1	1	7.5000000	1.8750	0.1960

Here, the t Tests for the parameter estimates are misleading. Neither of the tests (Temp or Temp*Temp) indicate statistical significance. This is why coding is so important when do polynomial regression.