

# Response Surface Analysis

---

*Source:* <http://sci.tech-archive.net/Archive/sci.stat.math/2005-08/msg00358.html>

---

- *From:* "Scott McClintock" <[scott@xxxxxxxxxx](mailto:scott@xxxxxxxxxx)>
  - *Date:* Mon, 29 Aug 2005 02:44:18 GMT
- 

Im trying to do a response surface analysis using SAS but am somewhat confounded. Ive taken a number of stat classes but will be the first to admit that Im rather weak when it comes to experimental designs and linear models.

Im working with three numeric variables x1, x2, x3 and a number of response variables. I gathered data using a circumscribed central composite design.

Ive been using proc rsreg but am not entirely sure how to go about interpreting the data and in what order to interpret it. On the offchance of

interest here is some sample output:

<http://www.id.unizh.ch/software/unix/statmath/sas/sasdoc/stat/chap56/sect5.htm>

My understanding is to look at the pvalues for each of the 9 (10 with intercept) coefficients and build your model/response surface from that.

Then look at the eigenvalues to check to see if its the expected optimum. If its not the expected optimum(saddlepoint for instance), or if the expected optimum is occuring at x values far outside the specified range then I need to use the ridge command to 'recalibrate' and run the study again.

Im not certain of how to interpret the tests on linear/quadratic/crossterm. Do I only consider checking the pvalues of the linear coefficients if the linear test is significant? Same with quadratic and crossterm? For instance I think I have one dependent variable where the crossterm test is insignificant but  $x_1 * x_3$  is significant. Should that be ignored?

What can or should be done if the lack of fit is significant?

How does one interpret/use/ignore the 4 df tests on x1, x2, x3?

Finally what if my model says that, for instance, x1 and x2 are significant but x3 is not. Then when I look at the eigenvalues I have positives for x1 and 2 and negative for x3. Since Im not including x3 would this no longer be a saddlepoint? Would it now be a minimum? Or should I still follow the ridge suggestions and run more

## Response Surface Analysis

experiments?

Answers to any questions, of any shallowness or depth are dearly appreciated. Im rather groping blindly and could use any sort of pity/help that the statistical cosmos has to offer.

Best regards,  
—Scott

- 
- Prev by Date: *Re: probability question*
  - Next by Date: *probabilities and likelihoods problem*
  - Previous by thread: *One way anova*
  - Next by thread: *probabilities and likelihoods problem*
  - Index(es):
    - ◆ *Date*
    - ◆ *Thread*