

Homework #4 -- due Monday, 18 February 2008 *** turn in just starred (*) questions ***

Exercise at the end of Chapter 2: 13*, 14, 15*

Exercises at the end of Chapter 3: 1, 2, 3, 7*, 8*, 10

0) Orthogonal polynomial contrasts arise in experiments where a dosage group is defined by equally spaced dosage levels. These polynomial contrasts are used to test if the response follows a low order polynomial, usually linear or quadratic. In textbooks (e.g. Steel, Torrie & Dickey, p. 390), they usually appear in a table as a list of signed integers, and a sum of squares. See Section 2.4 on Gram-Schmidt, and especially the SAS handout.

Construct orthogonal contrasts for a given value of N using the following approach. Construct $x_0 = 1$, $x_1 = i$, $x_2 = i^2$, ..., $x_k = i^k$, up to $k = 4$, and $i = 1, \dots, N$. Then regress (use PROC REG) x_k on 1 (intercept), x_1 , ..., $x_{(k-1)}$ and look at the residuals. Take the smallest residual in absolute value and rescale all of them so that the smallest one is ± 1 . The 'sum of squares' in the table should be your $SSE/(\text{smallest})^2$.