

Biostat 642 2002      Stats Homework

1. Identify & explain a dodgy assumption of linear system approach to modeling the hemodynamic response.
2. A study considers two possible treatments for bipolar subjects, drug A and drug B. For group A, let  $a_i$  be subject  $i$ 's time until a manic episode in days from the start of treatment; let  $b_j$  be subject  $j$ 's time until manic episode. We also have subject ages; let  $x_i$  be group A's ages and  $w_j$  be group B's ages. There are 20 subjects in each group. I fit an AnCova model with 3 parameters: (1) a group A mean  $\beta_1$ , (2) a group B mean  $\beta_2$ , (4) an age covariate  $\beta_3$  (I don't fit a grand mean).
  - Draw this model: Age on x-axis, y (relapse time) on y-axis, and a slope for each group.
  - In terms of  $\beta$ 's, what is intercept for group A?
  - Is the contrast  $[1 \ 0 \ 0]$  estimable? What is its interpretation?
  - What is the contrast for the group effect?
  - Write down the contrasts for the F-test of "no group effect and no age effect".
3. Describe what constitutes a Familywise Error.
4. All other things equal, increasing smoothness (i.e. increasing FWHM) has what impact on corrected p-values?
5. All other things equal, reducing search volume has what impact on corrected p-values?
6. What is the most important value in the footer of SPM's results display? Why?

Good luck on the project!