Fall 16 – AMS276 Homework 3

Due: Thursday December 1.

♣ Instruction

- Please read the paper (posted on our website), the book chapter and the lecture note for CRM.

- This homework is to reproduce part of BCLM Table 3.2. However, we have a different model (power model instead of hyperbolic tangent) and (possibly) different design parameters.

- You may use my CRM code that I shared with you. IF you use my CRM code, make sure that you understand how my code works and modify properly as needed for this homework. (Note: My code may have errors. If you find any, please report!)

1. We investigate the performance of CRM under three different scenarios through simulation. For the truth, we assume $m = 5$ and the probability of DLT are

    - Scenario 1: 0.05, 0.15, 0.30, 0.45, 0.60
    - Scenario 2: 0.05, 0.10, 0.20, 0.30, 0.50
    - Scenario 3: 0.15, 0.30, 0.45, 0.60, 0.85

    For the model, we assume $d_0 =$ 0.05, 0.15, 0.30, 0.45, 0.60 for each dose level (skeleton) and for patient i,

    $$y_i \mid d_i = d, a \sim \mathrm{Ber}(p(d)), i = 1, \ldots, n,$$

    where $p(d) = (d_0)^a$. For the prior, let $a \sim \mathrm{Gamma}(1, 1) = \mathrm{Exp}(1)$.

    Assume 20 and 1 for the maximum number of patients in a trial and the cohort size, respectively. Set TTL $\pi^\star = 0.3$. Use 100 simulated trials and evaluate the performance using the following criteria;

    - percentages of patients treated at the five dose level
    - percentage of trials recommending the true MTD as the MTD
    - overall percent of DLT

2. Change the cohort size from 1 to 3 and the remaining is the same as in 1. Evaluate the performance of CRM using the three criteria and compare it to that of the CRM with cohort size 1 (your results from part 1). Briefly comment on the comparison.