MATH 611

Homework 2

1. Five white balls and five black balls are distributed in two urns in such a way that each urn contains five balls. At each step we draw one ball from each urn and exchange them. Let be the number of black balls in the right urn at time n. Compute the transition probability for .
2. Consider a gambler’s ruin chain with N=4. That is and the two endpoints are absorbing states. Compute .
3. When a basketball player makes a shot then he tries a harder shot the next time and hits with probability 0.3 (misses with probability 0.7).When he misses, the next time he hits with probability 0.6. Write the transition probability matrix for the two-state Markov chain.
4. Use the accept-reject algorithm to generate 10000 observations from the Beta(2,2) distribution.
5. Generate the sample and construct a histogram. Superimpose the density curve of the theoretical model.
6. Comment on the precision of your outcomes, by comparing the empirical with the theoretical quantiles for a sequence of 100 quantiles and a QQ-plot.
7. Construct a rejection algorithm to generate 1000 observations from a target standard normal distribution, using a candidate double-exponential distribution . *Hint*: Explore the R-package {smoothmest} to generate the double-exponential observations.