BDA - Assignment 4

Anonymous

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Metropolis algorithm: Replicate the computations for the bioassay example of section 3.7 in BDA3 using the Metropolis algorithm. The Metropolis algorithm is described in BDA3 Chapter 11.2. More information on the bioassay data can be found in Section 3.7 in BDA3, and in Chapter 3 notes.

1. Implement the Metropolis algorithm as an R function for the bioassay data. Use the Gaussian prior as in Assignment 4, that is
2. Start by implementing a function called density\_ratio to compute the density ratio function, r in Eq. (11.1) in BDA3. Below is an example on how the function should work. You can test the function using markmyassignment.

data("bioassay")  
  
density\_ratio <- function(alpha\_propose, alpha\_previous, beta\_propose, beta\_previous, x, y, n) {  
   
}  
  
density\_ratio(alpha\_propose, alpha\_previous, beta\_propose, beta\_previous, x = bioassay$x, y = bioassay$y, n = bioassay$n)

## NULL

## [1] 1.305179  
  
density\_ratio <- function(alpha\_propose, alpha\_previous, beta\_propose, beta\_previous, x, y, n) {  
 return(1)   
}  
  
density\_ratio(alpha\_propose = 0.374, alpha\_previous = 1.89, beta\_propose = 20.04, beta\_previous = 24.76, x = bioassay$x, y = bioassay$y, n = bioassay$n)

## [1] 1

## [1] 0.7661784  
  
# mark\_my\_assignment()

Hint! Compute with log-densities. Reasons are explained on page 261 of BDA3 and lecture video 4.1. Remember that . For your convenience we have provided functions that will evaluate the log-likelihood for given