

Assignment 4

anonymous

1 General information

! Reporting accuracy

For posterior statistics of interest, only report digits for which the Monte Carlo standard error (MCSE) is zero.

Example: If you estimate $E(\mu) = 1.234$ with $\text{MCSE}(E(\mu)) = 0.01$, you should report $E(\mu) = 1.2$.

2 Bioassay model

2.1 (a)

2.2 (b)

Loading the library and the data.

```
# Useful functions: quantile()
# and mcse_quantile() (from aaltobda)

data("bioassay_posterior")
# The 4000 draws are now stored in the variable `bioassay_posterior`.
# The below displays the first rows of the data:
head(bioassay_posterior)
```

| | alpha | beta |
|---|-------------|-----------|
| 1 | -0.02050577 | 10.032841 |
| 2 | 1.21738518 | 4.504546 |
| 3 | 3.04829407 | 16.239424 |
| 4 | 1.32272770 | 4.924268 |
| 5 | 1.36274817 | 12.880561 |
| 6 | 1.08593225 | 5.943731 |

3 Importance sampling

3.1 (c)

```
# Useful functions: bioassaylp (from aaltobda)
alpha_test = c(1.896, -3.6, 0.374, 0.964, -3.123, -1.581)
beta_test = c(24.76, 20.04, 6.15, 18.65, 8.16, 17.4)

log_importance_weights <- function(alpha, beta) {
  # Do computation here, and return as below.
  # This is the correct return value for the test data provided above.
  c(-8.95, -23.47, -6.02, -8.13, -16.61, -14.57)
}
```

3.2 (d)

```
normalized_importance_weights <- function(alpha, beta) {
  # Do computation here, and return as below.
  # This is the correct return value for the test data provided above.
  c(0.045, 0.000, 0.852, 0.103, 0.000, 0.000)
}
```

3.3 (e)

Write your answers and code here!

3.4 (f)

```
S_eff <- function(alpha, beta) {
  # Do computation here, and return as below.
  # This is the correct return value for the test data provided above.
  1.354
}
```

3.5 (g)

3.6 (h)

```
posterior_mean <- function(alpha, beta) {  
  # Do computation here, and return as below.  
  # This is the correct return value for the test data provided above.  
  c(0.503, 8.275)  
}
```