Assignment 2

anonymous

1 General information

2 Inference for binomial proportion

Loading the library and the data.

```
library(aaltobda)
data("algae")
# The data are now stored in the variable `algae`.
# These are the values for the prior required in the assignment
prior_alpha = 2
prior_beta = 10
```

The below data is **only for the tests**, you need to change to the full data `algae` when reporting your results.

```
algae_test <- c(0, 1, 1, 0, 0, 0)
```

2.1 (a)

Write the likelihood, the prior and the posterior here!

```
# These are not the actual values for the posterior!
# You will have to compute those from the data!
posterior_alpha = 2
posterior_beta = 10
```

You can do string interpolation using R inline code execution in quarto as such: α_{prior} is **2** and β_{prior} is **10**. Or string interpolation within math: $\text{Beta}(2, 10)$

This template defines a `\BetaDist` TeX command which renders `$\BetaDist(1,2)$` as $\BetaDist(1,2)$.

2.2 (b)

Keep the below name and format for the functions to work with `markmyassignment`:

```
# Useful function: qbeta()

beta_point_est <- function(prior_alpha, prior_beta, data) {
    # Do computation here, and return as below.
    # This is the correct return value for the test data provided above,
    # combined with the prior provided above.
    0.2222222
}
beta_interval <- function(prior_alpha, prior_beta, data, prob=0.9) {
    # Do computation here, and return as below.
    # This is the correct return value for the test data provided above,
    # combined with the prior provided above.
    c(0.0846451, 0.3956414)
}
```

2.3 (c)

Keep the below name and format for the function to work with `markmyassignment`:

```
# Useful function: pbeta()

beta_low <- function(prior_alpha, prior_beta, data, pi_0=0.2) {
    # Do computation here, and return as below.
    # This is the correct return value for the test data provided above,
    # combined with the correct prior.
    0.4511238
}
```

2.4 (d)

Write your answer here!

2.5 (e)

Plot the PDFs here. Explain shortly what you do.

```
# Useful function: dbeta()
```