# Problem 1

Answer to the problem goes here.

1. Problem 1 part 1 answer here.

Which is the pdf of Gamma distribution (

1. Problem 1 part 2 answer here.

The posterior mean is . By plugging the number,

The MLE is

The prior mean is

1. Problem 1 part 3 answer here

R code:

plot(0, 0, xlim = c(0, 3), ylim = c(0, 1), type = "n")

curve(dgamma(x, shape = 5.5, scale = 0.11), from = 0, to = 3)

q1<-qgamma(0.025,shape = 5.5, scale = 0.11)

q2<-qgamma(0.975,shape = 5.5, scale = 0.11)

abline(v=c(q1,q2),col="red")

The 95% equitailed credible set is [0.2098662, 1.205603]

Chart, histogram

Description automatically generated

1. Problem 1 part 4 answer here

, posterior gamma (5.5, 9.41)

As

# Problem 2

Answer to the problem goes here.

1. Problem 2 part 1 answer here.

# Problem 2 part 2 answer here:

Which could be represented by

Therefore, , i.e. N (104.9, 34.3)

, i.e. N (98.6, 57.1)

As ,

As ,

Then the posterior is

The bayes estimator is expectation of this mixture distribution 0.63\*104.9+0.37\*98.6=102.6

**Problem 3**

Answer to the problem goes here.

1. Problem 3(a) part 1 answer here

Beta prior mean:

Posterior distribution: Beta (15+787, 5+1064-787), i.e. Beta(802, 282)

The posterior mean is 802/(802+282)=0.7398524

1. Problem 3(a) part 2 answer here:

R code: pbeta(0.75,802,282)

1. Problem 3(a) part 3 answer here:

R code:

qbeta(0.025,802,282): 0.7133363

qbeta(0.975,799,281): 0.7655302