Austin Wilson
Stat 128 hw 10
Example of app in action with shape 1 and 2

Gamma Distribution

shape

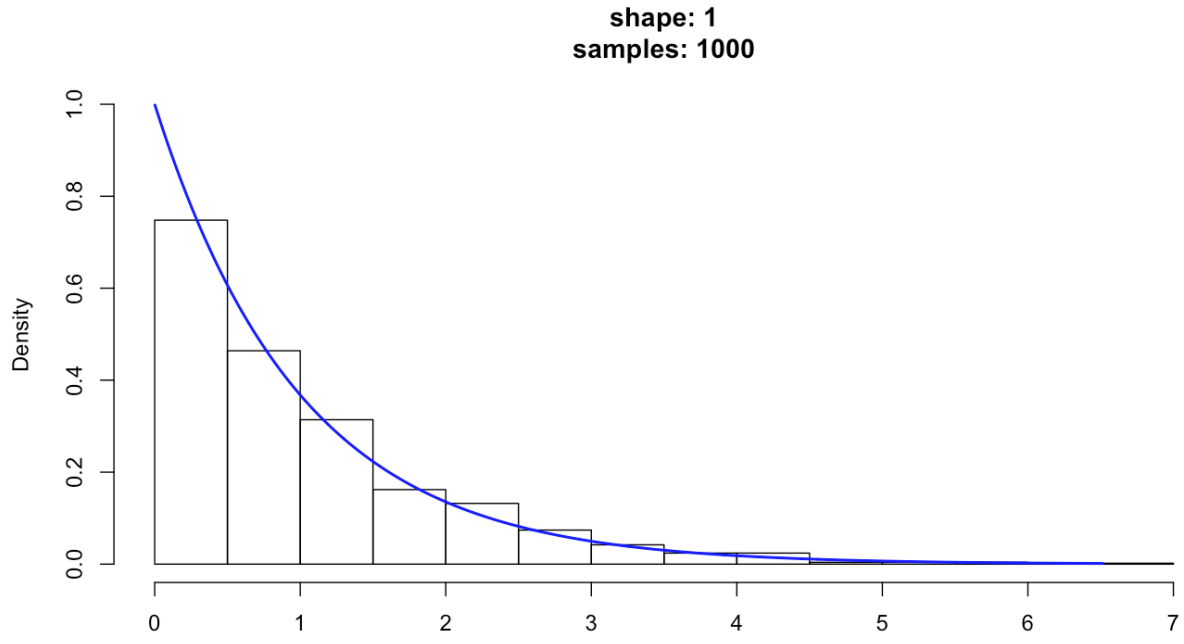
1

number of random samples in histogram

1000

number of breaks in histogram

10



Gamma Distribution

shape

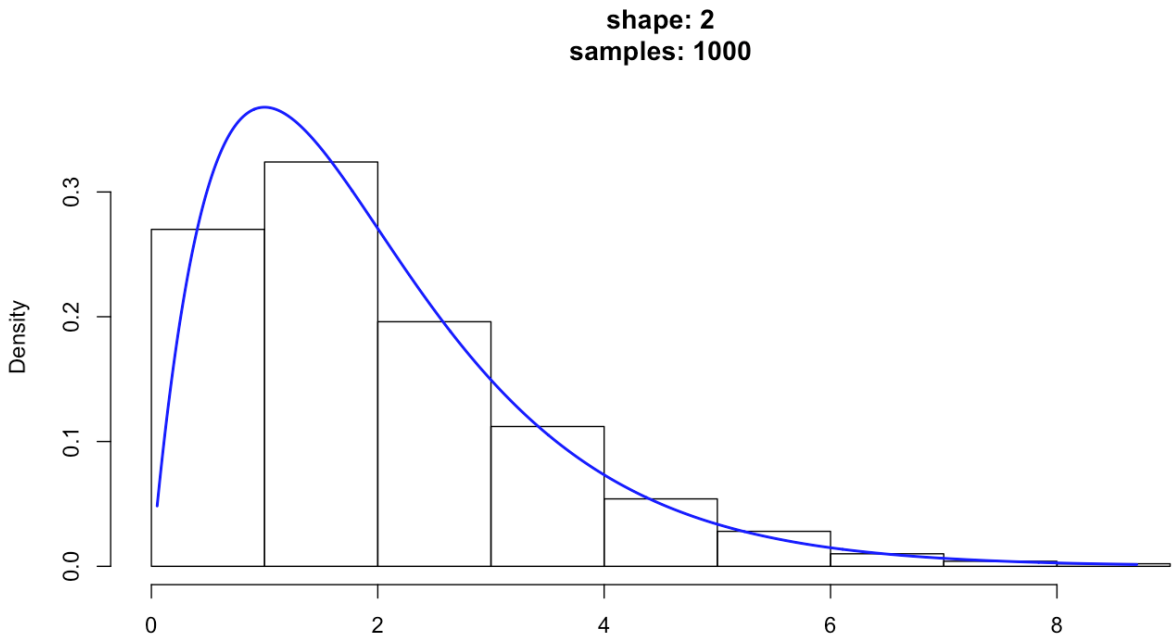
2

number of random samples in histogram

1000

number of breaks in histogram

10



Example of histogram converging to pdf. The meaning of convergence in this sense is that we are approximating the pdf of the gamma distribution by taking a random sample of x values and mapping them to the gamma function. Then plotting them with a histogram. The more values we have the closer we will be to the actual pdf.

Gamma Distribution

shape

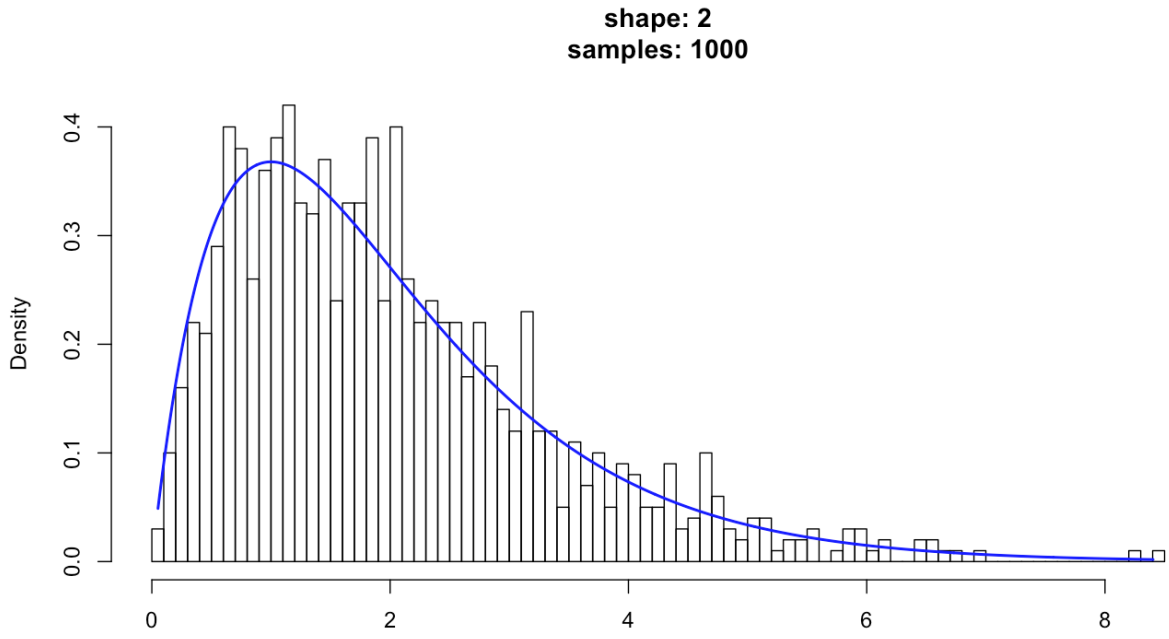
2

number of random samples in histogram

1000

number of breaks in histogram

100



Gamma Distribution

shape

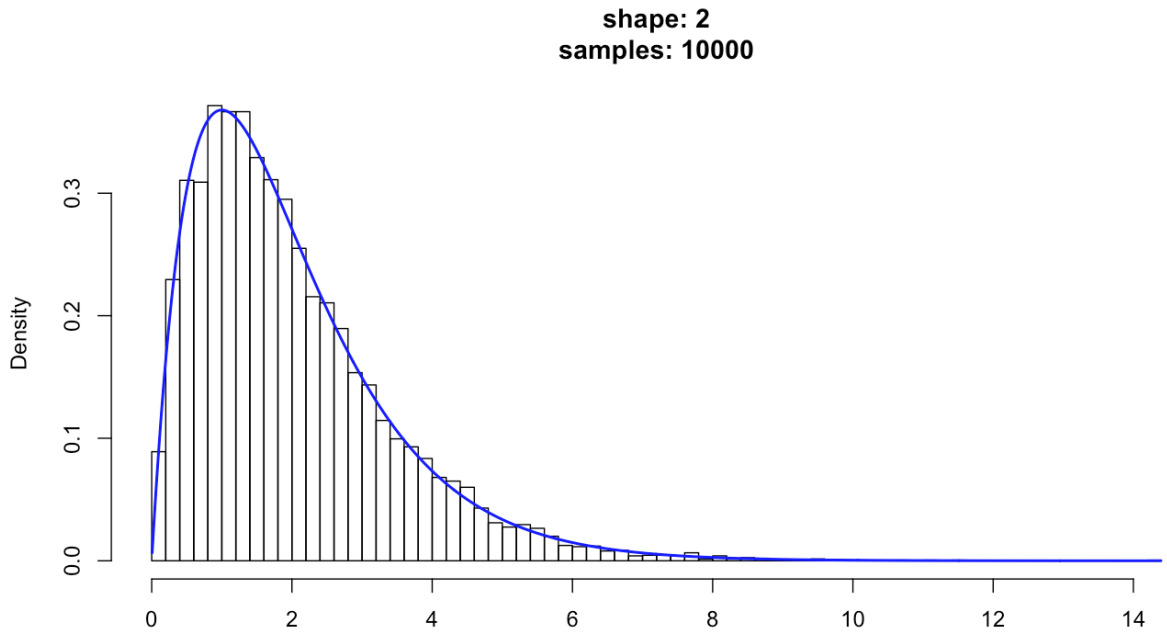
2

number of random samples in histogram

10000

number of breaks in histogram

100



Gamma Distribution

shape

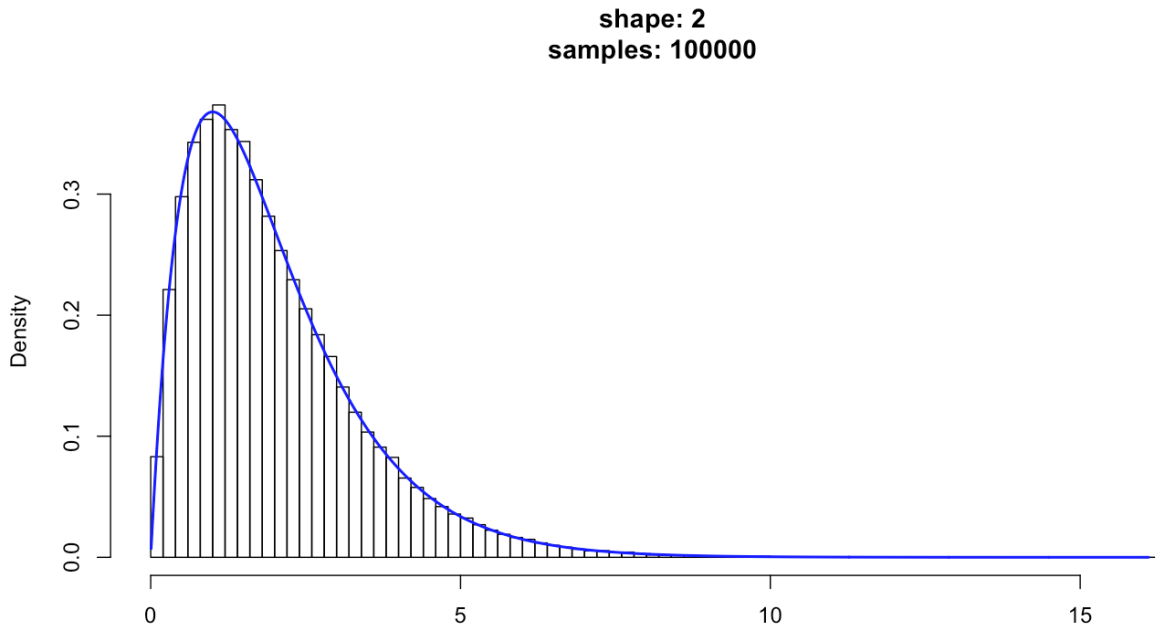
2

number of random samples in histogram

100000

number of breaks in histogram

100



app.R

```r
library(shiny)
ui <- fluidPage(
  titlePanel("Gamma Distribution")
  , numericInput("shape", label = "shape", value = 1)
  , numericInput("n", label = "number of random samples in histogram", value = 1000, min = 5)
  , numericInput("breaks", label = "number of breaks in histogram", value = 10, min = 5)
  , plotOutput("distplot")
)

# Define server logic ----
server <- function(input, output) {

  output$distplot = renderPlot({
    nsamples = input$n
    shape = input$shape
    main = sprintf("shape: %g\nsamples: %g", input$shape, input$n)

    samples = rgamma(nsamples, shape = shape)
    h = hist(samples, breaks = input$breaks, plot = FALSE)

    x = seq(from = min(samples), to = max(samples), length.out = 1000)
    y = dgamma(x, shape = shape)

    plot(h, freq = FALSE, xlab = "", main = main, ylim = c(0, max(y, h$density)))
    lines(x, y, col = "blue", lwd = 2)
  })
}

shinyApp(ui = ui, server = server)
```