Stat 343 MLE Practice: Saplings

Introduction

The code below reads in the seedlings data:

```
library(tidyverse)

seedlings <- read_table("http://www.evanlray.com/data/lavine_intro_stat_thought/seedlings.txt") %>%
  select(quadrat = Block,
    old_1991 = `91`,
    old_1992 = `92-t`,
    old_1993 = `93-t`,
    old_1994 = `94-t`,
    old_1995 = `95-t`,
    old_1996 = `96-t`,
    old_1997 = `97-t`,
    new_1992 = `92-1`,
    new_1993 = `93-1`,
    new_1994 = `94-1`,
    new_1995 = `95-1`,
    new_1996 = `96-1`,
    new_1997 = `97-1`
  )
```

Find the maximum likelihood estimate for the model parameter.

```
seedlings %>%
  summarize(
    mean_count = mean(new_1993)
  )
```

```
## # A tibble: 1 x 1
##   mean_count
##        <dbl>
## 1      0.733
```

```
# ...or...
mean(seedlings$new_1993)
```

```
## [1] 0.7333333
```

Create a density histogram of the data, and overlay on it a representation of the probability mass function for your chosen model based on the maximum likelihood parameter estimate. (For this second layer, you might set up a data frame with values of x and the corresponding probability mass function, and use `geom_point` and/or `geom_line`.)

```
poisson_fit <- data.frame(
  x = seq(from = 0, to = 10),
  pmf = dpois(seq(from = 0, to = 10), lambda = 0.7333333)
)

ggplot(data = seedlings, mapping = aes(x = new_1993, y = ..density..)) +
```

```
  geom_histogram(binwidth = 1) +
  geom_point(data = poisson_fit, mapping = aes(x = x, y = pmf), color = "red") +
  geom_line(data = poisson_fit, mapping = aes(x = x, y = pmf), color = "red")
```