F19 STA 100 A01 Discussion 09

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2019/11/26

Discussion Time: Tuesday 8:00 – 8:50 am, Haring Hall 1204.

Notes: https://github.com/Hahahuo-13316/sta100-a01-fall19

Office hour: Tuesday 12:00 – 1:00 pm, Mathematical Sciences Building 1117.

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How to calculate t-distribution using R

Example: let $Y_1, \ldots, Y_n$ be a random sample from distribution $N(\mu, \sigma^2)$, where σ^2 is unknown. Suppose $n = 10$, sample mean $\bar{Y} = 2.6$, the standard error of sample mean is $s = 0.5$.

- Construct a 95% confidence interval for μ.
- Perform a two-sided t-test to find out whether $\mu = 1.23$, with significant level $\alpha = 0.02$.

```
2.6 + c(lower.bound = -1, upper.bound = 1) * qt(0.975, 9) * 0.5
```

```
## lower.bound upper.bound
##    1.468921    3.731079
```

```
c(p.value = 2 * (1 - pt((2.6 - 1.23) / 0.5, 9)), significant.level = 0.02)
```

```
##           p.value significant.level
##        0.02284757        0.02000000
```

```
c(ts = (2.6 - 1.23) / 0.5, critical.value = qt(0.99, 9))
```

```
##             ts critical.value
##       2.740000       2.821438
```