Math 107

Theory-Based Inference in R for Intro Stats

Spring 2016

This reference cards provides you with the recipes for working with the normal and t distributions to construct confidence intervals and carryout hypothesis tests. You will need to carefully consider what ingredients need to be changed for each recipe...

Distributions

In the below recipes `q` stands for some cutoff and `p` denotes the percentile of interest (e.g., 0.975 denotes the 97.5th percentile.)

```
pnorm(q)  # area to the left of q
qnorm(p)  # find the critical value/percentile
pt(q, df) # area to the left of q
qt(p, df) # find the critical value/percentile
```

Randomization Tests

One proportion

Change `n` and `prob` to match the problem.

```
null_dsn <- do(1000) * rflip(n, prob = 0.5)
```

Two proportions

Change `responsevar`, `"level"`, `groupvar`, and `data_set` to match the problem.

```
null_dsn <- do(1000) *
  diffmean(responsevar == "level" ~ shuffle(groupvar), data = data_set)
```

Two means

Change `responsevar`, `groupvar`, and `data_set` to match the problem.

```
null_dsn <- do(1000) *
  diffmean(responsevar ~ shuffle(groupvar), data = data_set)
```

Calculating p-values

Change `colname` and `observed` to match the problem.

```
prop(~colname >= observed, data = null_dsn) # upper tail
prop(~colname <= observed, data = null_dsn) # lower tail
```

Bootstrap Confidence Intervals

One mean

Change `variable` and `data_set` to match the problem.

```
boot_dsn <- do(1000) * mean(~variable, data = resample(data_set))
```

Two means

Change `responsevar`, `groupvar`, and `data_set` to match the problem.

```
boot_dsn <- do(1000) * diffmean(responsevar ~ groupvar, data = resample(data_set))
```

One proportion

Change `responsevar`, `"level"`, and `data_set` to match the problem.

```
boot_dsn <- do(1000) * prop(~variable == "level", data = resample(data_set))
```

Two proportions

Change `responsevar`, `"level"`, `groupvar`, and `data_set` to match the problem.

```
boot_dsn <- do(1000) *
  diffmean(responsevar == "level" ~ groupvar, data = resample(data_set))
```

Standard Error

Change `colname` to match the problem.

```
se <- sd(~colname, data = boot_dsn)
```