

Assignment 8 STAT 581

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Problem

Using the `ks.test`

Build a goodness of fit test for each distribution using the parametric bootstrap based on maximum likelihood.

Answer

Step 1: We copy Assignment 6 function to calculate $\hat{\theta}$ for different dataset.

Step 2: By using `ks.test()` function to calculate $\sup_x |F_n x - F\hat{\theta}_n|$

```
1 hat=ks.test(vec0,"pbinom",1,pval$maximum)$statistic
```

step 3: Using $\hat{\theta}$ in step 1 to do parametric bootstrap for n times and generate n $F_n x^*$ and calculate $\sup_x |F_n x^* - F\hat{\theta}_n^*|$

```
1 Paraboot<-function(funcname,parameter,l,n,hats){
2   for (i in 1:n){
3     star=0
4     if (funcname=="Bernoulli"){
5       data=rbinom(1,1,parameter[1])
6       parahatstar=MLEestimator(data,"Bernoulli")$para
7       star=ks.test(data,"pbinom",1,parahatstar[1])$statistic
8     }
9   }
10 }
```

step 4: Comparing how many times that $\sup_x > \sup_x^*$

```
1   if (star>hats){
2     correctrate=correctrate+1
3   }
```

Step 5: Get probability of $\sup_x > \sup_x^*$ and return as goodness of fit.

```
1   paste("goodness_of_fit", correctrate/n)
```