

STAT 672  
Homework 8  
due Wed. April 12

3 Problems. Show all work. Please follow the Lab report directions off the homework web page for R Problems. Please work in Groups 2 (or 3)

Note: The dataset for this homework is available in the NSM3 package. You will have to install this package and:

```
> library(NSM3)
> data(discrepancy.scores)
```

1. p. 616, 12.1 and some extra parts. The histogram function in R is a little funny with “pretty”, so we will use the `truehist` function in the MASS library, as well the `hist` function.

To answer this question you will compare 3 histograms using: Freedman-Diaconis rule, Scott’s rule, and Sturge’s rule. You can plot all 3 on the same page.

1) FD: Following the textbook calculate the bandwidth  $h$  in R using the formula on p. 612. Use the `truehist` function with the argument `nbins=“FD”` AND the argument `h=?` using your F-D calculated  $h$ .

2) Scott: Following the textbook calculate the bandwidth  $h$  in R using the formula on p. 615. Use the `truehist` function with the argument `nbins=“Scott”` AND the argument `h=?` using your Scott calculated  $h$ .

3) Sturges: Following the textbook calculate the number of bins  $m$  in R using the formula on p. 615. Use the `hist` function with the argument `breaks=“Sturges”`. Do not specify the number of bins.

Now, compare the three histograms.

2. p. 624, 12.7 and some extra parts.

To answer this questions we will use the R function `density` and make 2 sets of plots.

1) Compare the kernel density estimates using 4 different kernels: gaussian, epanechnikov, rectangular, triangular. Be sure to use the same bandwidth argument `bw=0.1443 (1/(4√3))` for each plot.

2) Compare the kernel density estimates of a Gaussian or normal kernel using 4 different bandwidths: 0.005, 0.05, 0.14, 5

3. p. 627, 12.13 and some extra parts.

To answer this questions we will use the R function `density`. Compare the kernel density estimates of a Gaussian or normal kernel using 4 different bandwidths selection methods: `nrd0`, `nrd`, `ucv`, `bcv`