Stat 311: HW 5, Chapters 6 & 7, Comments

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Ch. 6, Problem 7. (a) argue your case by example using a discrete pmf and/or continuous pdf. Although the question is general, I don't require a general proof.

(b) Consider what happens when you move slightly less than 25% of the upper and lower tail of the distribution around. Focus on symmetric distributions.

(c) Similar as in (b), but you have to drop the symmetry restriction.

(e) Consider what happens when you move the probability mass on either side of the median around.

For the next three problems download the files `sample771.dat`, `pulses.dat`, `sample773.dat` from `http://mypage.iu.edu/~mtrosset/StatInfeR.html` and put them into the directory from which you launch your R session for HW 5. You download each respective file by right-clicking on the appropriate link and then choose "save link to ..." or whatever looks similar.

Ch. 7, Problem 1. Read the data in as shown below and do the required plots and calculations. Show your commands, results and plots.

```
> sample.771 <- scan("sample771.dat")
```

To judge the sampling variability of plug-in estimate of iqr over sqrt of the plug-in estimate of variance when sampling from a normal population, I provide the following function. Cut and paste it into your workspace, and execute `iqrsigma.hist(1000,25)`

```
iqrsigma.hist <- function(Nsim=1000,n=25){
iqrsigma <- numeric(Nsim) #allocates space for a vector of length Nsim
# in the following for-loop we fill that vector with simulated values
# of the iqr/sigma ratio as obtained from plug-in estimates.
for(i in 1:Nsim){
    x <-rnorm(n)
    sigma <- sqrt(var(x)*(n-1)/n)
    quart <- quantile(x,prob=c(0.25,0.75))
    iqr <- quart[2]-quart[1]
    iqrsigma[i] <- iqr/sigma
}
hist(iqrsigma,xlab="plug-in iqr/plug-in sigma",main="")
}
```

Ch. 7, Problem 2. (basically a repeat of the previous problem with a different data set)

```
> pulses <- scan("pulses.dat") # reading the data from file pulses.dat
```

Ch. 7, Problem 3. Since the data consists of a matrix (10×4) we use a different command to load the data (into a matrix).

```
> sample773 <- read.table("sample773.dat")
# you can get a boxplot simply by
> boxplot(sample773) #or boxplot(sample773[,1],sample773[,2],sample773[,3],sample773[,4])
# you can simulate a similar matrix with four samples
# from a common normal distribution by
> simsample <- data.frame(rnorm(10),rnorm(10),rnorm(10),rnorm(10))
# and then look at its side by side boxplots for comparison.
# you may want to do this several times to get an appreciation
# of sampling variability.
```