

## Code

```
# code prep for hw6

# clear workspace
rm(list=ls())
setwd("C:/z_toshiba/course work/phd/econ 761/hw/hw6/")

library(readr)
bidder_data <- read_table2("fpa.dat", col_names = FALSE)
colnames(bidder_data) <- c("bidder_1", "bidder_2", "bidder_3", "bidder_4")

bidder_data2 <- stack(bidder_data)
colnames(bidder_data2) <- c("bid", "bidder")

# density for each bidder
b1_pdf <- density(bidder_data$bidder_1, kernel = "epanechnikov")
b2_pdf <- density(bidder_data$bidder_2, kernel = "epanechnikov")
b3_pdf <- density(bidder_data$bidder_3, kernel = "epanechnikov")
b4_pdf <- density(bidder_data$bidder_4, kernel = "epanechnikov")
#plot(b1_pdf)
#plot(b2_pdf)
#plot(b3_pdf)
#plot(b4_pdf)

# cdf for each bidder
b1_cdf <- ecdf(bidder_data$bidder_1)
b2_cdf <- ecdf(bidder_data$bidder_2)
b3_cdf <- ecdf(bidder_data$bidder_3)
b4_cdf <- ecdf(bidder_data$bidder_4)
#plot(b1_cdf)
#plot(b2_cdf)
#plot(b3_cdf)
#plot(b4_cdf)

# density for all bidders
all_b_pdf <- density(bidder_data2$bid, kernel = "epanechnikov")
#plot(all_b_pdf)

# cdf for all bidders
all_b_cdf <- ecdf(bidder_data2$bid)
#plot(all_b_cdf)

# estimated values of  $F_u$ 
all_b_cdf(quantile(bidder_data$bidder_1)[2])
```

```
## [1] 0.2785
```

```
all_b_cdf(quantile(bidder_data$bidder_2)[2])
```

```
## [1] 0.2275
```

```
all_b_cdf(quantile(bidder_data$bidder_3)[2])
```

```
## [1] 0.253
```

```
all_b_cdf(quantile(bidder_data$bidder_4)[2])
```

```
## [1] 0.242
```

```
all_b_cdf(quantile(bidder_data$bidder_1)[4])
```

```
## [1] 0.759
```

```
all_b_cdf(quantile(bidder_data$bidder_2)[4])
```

```
## [1] 0.7305
```

```
all_b_cdf(quantile(bidder_data$bidder_3)[4])
```

```
## [1] 0.736
```

```
all_b_cdf(quantile(bidder_data$bidder_4)[4])
```

```
## [1] 0.767
```

```
# correlation between values
```

```
val_ind <- lm(bidder_data$bidder_1 ~ bidder_data$bidder_2+  
              bidder_data$bidder_3+bidder_data$bidder_4)
```

```
coefs <- summary(val_ind)$coefficients
```

```
coefs
```

```
##               Estimate Std. Error    t value    Pr(>|t|)  
## (Intercept)      80.35866286  5.88453069  13.6559170 2.870301e-36  
## bidder_data$bidder_2 -0.03152048  0.04304509  -0.7322666 4.643517e-01  
## bidder_data$bidder_3 -0.02086055  0.04470880  -0.4665872 6.410001e-01  
## bidder_data$bidder_4  0.01355397  0.04347638   0.3117549 7.553578e-01
```