R Lab 6. Simultaneous Estimation

(Sec. 4.1 and 30.2 [in Applied Linear Statistical Models book])

```
> attach(mtcars)
> reg = lm( mpg ~ wt )                    # Standard regression
> b = coef(reg)                           # Save coefficients
> b
(Intercept)          wt
  37.285126   -5.344472

                                          # 97.5% confidence intervals
> CI = confint(reg,alpha=0.025)           # (with Bonferroni adjustment)
> CI
                2.5 %    97.5 %
(Intercept) 33.450500 41.119753
wt          -6.486308 -4.202635

> install.packages("ellipse");  library(ellipse)
                                # 95% confidence ellipse for β = (β0, β1)
> plot(ellipse(reg,alpha=0.05),type="l",col="red",lwd=3,
main="Confidence ellipse and Bonferroni confidence intervals")
> points(b[1],b[2])             # Point estimator of vector β = (β0, β1)
> lines(CI[1,],CI[2,1]*c(1,1),col="blue",lwd=2) # Bonferroni
> lines(CI[1,],CI[2,2]*c(1,1),col="blue",lwd=2) # confidence
> lines(CI[1,1]*c(1,1),CI[2,],col="blue",lwd=2) # intervals on
> lines(CI[1,2]*c(1,1),CI[2,],col="blue",lwd=2) # the same plot
```