[Example6-5,6] Confidence Interval and Prediction Interval

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```
load("~/計量経済学演習/R data sets for 5e/gpa2.RData")
gpa2<-data
```

```
(reg <- lm(colgpa~sat+hsperc+hsize+I(hsize^2),data=gpa2))
```

```
##
## Call:
## lm(formula = colgpa ~ sat + hsperc + hsize + I(hsize^2), data = gpa2)
##
## Coefficients:
## (Intercept)         sat      hsperc       hsize   I(hsize^2)
##    1.492652    0.001492   -0.013856   -0.060881    0.005460
```

three sets of regressor variables を一気に define

```
cvalues <- data.frame(sat=c(1200,900,1400), hsperc=c(30,20,5),
                                  hsize=c(5,3,1))
cvalues
```

```
##    sat hsperc hsize
## 1 1200     30     5
## 2  900     20     3
## 3 1400      5     1
```

Point estimates and 95%,99% “confidence”" intervals(regressorはdata.frameで指定)

```
predict(reg, cvalues, interval = "confidence")
```

```
##        fit      lwr      upr
## 1 2.700075 2.661104 2.739047
## 2 2.425282 2.397329 2.453235
## 3 3.457448 3.402766 3.512130
```

```
predict(reg, cvalues, interval = "confidence", level=0.99)
```

```
##       fit     lwr     upr
## 1 2.700075 2.648850 2.751301
## 2 2.425282 2.388540 2.462025
## 3 3.457448 3.385572 3.529325
```

Point estimates and 95% “prediction”" intervals

```
predict(reg, cvalues, interval = "prediction")
```

```
##       fit     lwr     upr
## 1 2.700075 1.601749 3.798402
## 2 2.425282 1.327292 3.523273
## 3 3.457448 2.358452 4.556444
```

confidence intrvalもprediction intervalもdataにないregressor variablesの時の“予測”のintervalだが、confidence intervalはregressorがその状況の時のcolgpaのexpected valueのintervalなのに対し**prediction interval はindividualのcolgpaのinterval**なので、**fitted value**は同じでも当然**interval**は**prediction interval**の方が大きくなる。