Rexample2

Lingxiao Zhou

Copier example

```
copier <- read.csv("https://raw.githubusercontent.com/lingxiaozhou/STA4210Rmaterial/main/data/copiers.cs
    skip = 1, header = TRUE)

reg <- lm(Time ~ Copiers, data = copier)


# CI on mean response when Copiers=8
predict(reg, newdata = data.frame(Copiers = 8), se.fit = TRUE,
    interval = "confidence")
```

```
## $fit
##        fit      lwr      upr
## 1 119.7018 115.8157 123.5879
##
## $se.fit
## [1] 1.926974
##
## $df
## [1] 43
##
## $residual.scale
## [1] 8.913508
```

```
# PI on predicted value when Copiers=8
predict(reg, newdata = data.frame(Copiers = 8), interval = "prediction")
```

```
##        fit      lwr      upr
## 1 119.7018 101.3108 138.0929
```

```
# Working-Hotelling Confidence band
CI <- predict(reg, se.fit = TRUE)
W <- sqrt(2 * qf(0.95, length(reg$coefficients), reg$df.residual))
Band <- cbind(CI$fit - W * CI$se.fit, CI$fit + W * CI$se.fit)

# generate scatter plot
plot(copier$Copiers, copier$Time)
# add the regression line
abline(reg)
# use index to make sure Copiers is in the increasing order
```

```
index <- order(copier$Copiers)
points(copier$Copiers[index], Band[index, 1], type = "l", lty = 2)
points(copier$Copiers[index], Band[index, 2], type = "l", lty = 2)
legend("topleft", legend = c("Mean Line", "95% CB"), col = c(1,
    1), lty = c(1, 2), bg = "gray90")
```