HW01

2024-03-21

2.7

a

```
lm.fit <- lm(purity ~ hydro, data = p27)
```

b

```
summary(lm.fit)
```

```
##
## Call:
## lm(formula = purity ~ hydro, data = p27)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.6724 -3.2113 -0.0626  2.5783  7.3037
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)   77.863      4.199  18.544 3.54e-13 ***
## hydro         11.801      3.485   3.386  0.00329 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.597 on 18 degrees of freedom
## Multiple R-squared:  0.3891, Adjusted R-squared:  0.3552
## F-statistic: 11.47 on 1 and 18 DF,  p-value: 0.003291
```

p-value : 0.00329 유의수준 (alpha = 0.05)보다 작으므로 H0를 기각할 수 있다. ## c

R^2 : 0.3891

d

```
confint(lm.fit, level = 0.95)
```

```
##                 2.5 %   97.5 %
## (Intercept) 69.041747 86.68482
## hydro        4.479066 19.12299
```

(4.479066, 19.12299)

e

```
predict(lm.fit, data.frame(hydro = 1), interval = "confidence")
```

```
##        fit      lwr      upr
## 1 89.66431 87.51017 91.81845
```

(87.51017, 91.81845)

2.8

a

```
cor(p27$hydro, p27$purity)
```

```
## [1] 0.6237968
```

상관계수가 0.6237968이므로 양의 상관관계가 있다고 볼 수 있다.

b

```
cor.test(p27$hydro, p27$purity)
```

```
##
##  Pearson's product-moment correlation
##
## data:  p27$hydro and p27$purity
## t = 3.3861, df = 18, p-value = 0.003291
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.2503961 0.8356439
## sample estimates:
##       cor
## 0.6237968
```

p-value가 0.003291로 유의수준 5% 보다 작으므로 귀무가설을 기각할 수 있다. hydro와 purity는 선형적으로 상관관계가 있다.

c

(0.2503961, 0.8356439)