

Survival analysis_HW4

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2019_11_25

```
library(survival)
library(KMsurv)

data("larynx")
data <- larynx

surv_data <- Surv(time = data$time, event = data$delta)
data_reg_log <- survreg(surv_data ~ factor(stage) + age, dist = "loglogistic", data = data)
summary(data_reg_log)

##
## Call:
## survreg(formula = surv_data ~ factor(stage) + age, data = data,
##   dist = "loglogistic")
##
##              Value Std. Error      z      p
## (Intercept)   3.1022    0.9527  3.26 0.0011
## factor(stage)2 -0.1257    0.4152 -0.30 0.7621
## factor(stage)3 -0.8057    0.3539 -2.28 0.0228
## factor(stage)4 -1.7661    0.4257 -4.15 3.3e-05
## age           -0.0151    0.0138 -1.10 0.2734
## Log(scale)    -0.3352    0.1202 -2.79 0.0053
##
## Scale= 0.715
##
## Log logistic distribution
## Loglik(model)= -141.6   Loglik(intercept only)= -151.6
##   Chisq= 20.07 on 4 degrees of freedom, p= 0.00048
## Number of Newton-Raphson Iterations: 4
## n= 90

## 각 모수들의 추정량
mu_hat <- data_reg_log$coefficients[1]
sigma_hat <- data_reg_log$scale
lamda_hat <- exp(-mu_hat/sigma_hat)
alpha_hat <- 1/sigma_hat
```

```
beta_hat <- -data_reg_log$coefficients[2:length(data_reg_log$coefficients)] / sigma_hat
beta_hat
```

```
## factor(stage)2 factor(stage)3 factor(stage)4          age
##      0.17577151      1.12654150      2.46937245      0.02109404
```

```
exp(beta_hat[1])  ## stage1에 비해 stage2 일 때 odds비의 증가분 (odss 비 =  $s/1-s$ )
```

```
## factor(stage)2
##      1.192166
```

```
exp(beta_hat[2])  ## stage1에 비해 stage3 일 때 odds비의 증가분 (odss 비 =  $s/1-s$ )
```

```
## factor(stage)3
##      3.084969
```

```
exp(beta_hat[3])  ## stage1에 비해 stage4 일 때 odds비의 증가분 (odss 비 =  $s/1-s$ )
```

```
## factor(stage)4
##      11.81503
```