**Appendix**

Library(Survival)

set.seed(1234)

alpha <- function(enroll\_number, TrialN) {

mPFSs <- c(5, 5)

alpha <- 0.025

cat("Enrollment in arms 1 and 2 is ", enroll\_number, "nn")

R1 <- numeric(TrialN)

R2 <- numeric(TrialN)

lHR <- numeric(TrialN)

V <- numeric(TrialN)

#sd by theory

r <- enroll\_number[1]/sum(enroll\_number)

sd <- sqrt(1/(r\*(1-r)\*sum(enroll\_number)))

sd

for (j in 1:TrialN) {

PFS1 <- rexp(enroll\_number[1], log(2)/mPFSs[1])

PFS2 <- rexp(enroll\_number[2], log(2)/mPFSs[2])

arm1 <- data.frame(arm=rep(0, enroll\_number[1]), PFS=PFS1)

arm2 <- data.frame(arm=rep(1, enroll\_number[2]), PFS=PFS2)

All <- rbind(arm1, arm2)

All2 <- cbind(All, event=rep(1, dim(All)[1]))

logrank <- survdi¤(Surv(PFS, event)~arm, data=All2)

O <- logrank$obs[1]

E <- logrank$exp[1]

Vl <- logrank$var[1, 1]

Z <- (O-E)/sqrt(Vl)

p1 <- 1-pnorm(Z)

cox <- coxph(Surv(PFS, event)~arm, data=All2, ties="breslow")

p2 <- ifelse(summary(cox)$coe¢ cients[1]<0, summary(cox)$waldtest[3]/2,

1-summary(cox)$waldtest[3]/2)

R1[j] <- ifelse(p1<alpha, 1, 0)

R2[j] <- ifelse(p2<alpha, 1, 0)

lHR[j] <- summary(cox)$coe¢ cients[1]

V[j] <- summary(cox)$coe¢ cients[3]

}

alpha1.hat <- mean(R1)

alpha2.hat <- mean(R2)

cat("Estimated type I error rate of log rank test ", alpha1.hat, "nn")

cat("Estimated type I error rate of Wald test ", alpha2.hat, "nn")

lHR.hat <- mean(lHR)

cat("estimated log HR is ", lHR.hat, "nn")

sd.hat <- mean(V)

cat("estimated standard deviation for log(HR) is ", sd.hat, "nn")

#sd in theory

r <- enroll\_number[1]/sum(enroll\_number)

sd <- sqrt(1/(r\*(1-r)\*sum(enroll\_number)))

cat("standard deviation of log(HR) by theory", sd, "nn")

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}

TrialN <- 100000

sim <- function(nSum, r) {

n1 <- nSum\*r

n2 <- nSum-n1

enroll\_number <- c(n1, n2)

alpha(enroll\_number, TrialN)

}

sim(600, 0.5)

sim(600, 0.4)

sim(600, 1/3)

sim(600, 0.25)

sim(1200, 1/3)

sim(2400, 1/3)

sim(6000, 1/3)