STA355 mt

Ke Deng

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Question 1b) i)maximum likelihood estimate of lambda (spacing)

```
prob1 <- scan("prob1.txt")
mspacings <- function(x,m=1) {
  x <- sort(x)
  n <- length(x)
  x1 <- c(rep(NA,m),x)
  x2 <- c(x,rep(NA,m))
  sp <- min(x1,x2)
  mid <- 0.5*(x1+x2)[(m+1):n]
  r <- list(x=x,spacings=sp,midpoints=mid)
  r
}

spacing <- mspacings(prob1, m=11)

lambda <- length(prob1)/ sum(spacing$x)

print(lambda)
```

```
## [1] 0.4052356
```

```
variance <- lambda**2 / length(prob1)
sd <- sqrt(variance)
print(sd)
```

```
## [1] 0.05730897
```

Question 2b)

```
prob2 <- scan("prob2.txt")
#By substitution principle
AF <- function(x){
  1- 1/ mean(x) * exp(mean(log(x)))
}

ahat <- AF(prob2)
print(ahat)
```

```
## [1] 0.8433327
```

```r
print("By the substitution principle, the estimate of A(F) is 0.84.")
```

```
## [1] "By the substitution principle, the estimate of A(F) is 0.84."
```

```r
#calculating sd using jackknife
l = NULL
n = length(prob2)
for (i in 1:n){
  l <- c(l, AF(prob2[-i]))
}

sehat <- sqrt((n-1)*sum((l-mean(l))^2)/n)
print(sehat)
```

```
## [1] 0.03050121
```

```r
print("Using the jackknife formula, the estimate of its standard error is 0.0305.")
```

```
## [1] "Using the jackknife formula, the estimate of its standard error is 0.0305."
```

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