rm(list = ls())

lambda <- seq(0,10,0.01)

## 18(3)

newtonraphson <- function(ftn, x0, tol = 1e-9, max.iter = 100) {

x <- x0 # 先把 x assign 為起始值 x0

fx <- ftn(x)

iter <- 0

while ((abs(fx[1]) > tol) & (iter < max.iter)) {

x <- x - fx[1]/fx[2]

fx <- ftn(x)

iter <- iter + 1

cat("At iteration", iter, "value of x is:", x, "\n")

}

if (abs(fx[1]) > tol) {

cat("Algorithm failed to converge\n")

return(NULL)

} else {

cat("Algorithm converged\n")

return(x)

}

}

ftn <- function(lambda) {

fp <- 0

dfp <- 0

X <- c(3,1,2,0,6,8,4,5,7,0)

for (i in 1:length(X)){

fp <- fp + (-lambda\*exp(-1)+X[i]\*lambda^(-1)-(factorial(X[i]))^(-1))

dfp <- dfp + (-lambda^-1\*exp(-1)-X[i]\*lambda^-2-(factorial(X[i]))^-1)

}

return(c(fp, dfp))

}

newtonraphson(ftn, 3, 1e-06)

> newtonraphson(ftn, 3, 1e-06)

At iteration 1 value of x is: 2.692029

At iteration 2 value of x is: 2.66727

At iteration 3 value of x is: 2.663955

At iteration 4 value of x is: 2.663495

At iteration 5 value of x is: 2.663431

At iteration 6 value of x is: 2.663422

At iteration 7 value of x is: 2.663421

At iteration 8 value of x is: 2.66342

Algorithm converged

[1] 2.66342