Application of root finding

Thomas Achia

4/3/2023

## Root finding methods in action-Applications in Generalized linear model

That is,

## Example

y=c(10,30,34,55,78,90,100)  
c1<-rep(1,7)  
x1<-c(1,2,3,4,5,6,7)  
  
X=cbind(c1,x1)  
X

## c1 x1  
## [1,] 1 1  
## [2,] 1 2  
## [3,] 1 3  
## [4,] 1 4  
## [5,] 1 5  
## [6,] 1 6  
## [7,] 1 7

XtX=t(X)%\*%X  
  
Xty=t(X)%\*%y  
  
solve(XtX)%\*%Xty

## [,1]  
## c1 -5.285714  
## x1 15.500000

fit=lm(y~x1)  
summary(fit)

##   
## Call:  
## lm(formula = y ~ x1)  
##   
## Residuals:  
## 1 2 3 4 5 6 7   
## -0.2143 4.2857 -7.2143 -1.7143 5.7857 2.2857 -3.2143   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -5.2857 4.1821 -1.264 0.262   
## x1 15.5000 0.9351 16.575 1.46e-05 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 4.948 on 5 degrees of freedom  
## Multiple R-squared: 0.9821, Adjusted R-squared: 0.9786   
## F-statistic: 274.7 on 1 and 5 DF, p-value: 1.46e-05