SEnoL Newton

Agustin Huczok

30/9/2021

#Norma

```
norma <- function(y, metodo){
  if (metodo==2){
    return(sqrt(sum(y^2)))
  }
  if (metodo==Inf){
    return(max(abs(y)))
  }
  return("El metodo debe ser 2 o Inf")
}
```

#Sistema Ec. No lineal Newton

```
Sist_Ec_NoLineal_Newton <- function(n,x,TOL,N){
  #Paso 1
  k <- 1
  #Paso 2
  while(k<=N){
    #Paso 3
    fx <- Fx(x)
    J <- Jacobiano(x[1],x[2])
    #Paso 4
    y = solve(J)%*%-fx
    #Paso 5
    x <- x + t(y)
    #Paso 6
    if (norma(y,2) < TOL){
      return(x)
    }
    #Paso 7
    k <- k+1
  }
  #Paso 8
  return(paste('Numero max de iteraciones excedido'))
}
```

#Calculo derivadas dos variables

```
fa=function(x1,x2){

}

fae=expression()
D(fae,"x1")
```

```
## [1] NA
```

```
D(fae,"x2")
```

```
## [1] NA
```

```
dfa1=function(x1,x2){}
dfa2=function(x1,x2){}


fb=function(x1,x2){

}
fbe=expression()
D(fbe,"x1")
```

```
## [1] NA
```

```
D(fbe,"x2")
```

```
## [1] NA
```

```
dfb1=function(x1,x2,x3){}
dfb2=function(x1,x2,x3){}
```

#Calculo derivadas tres variables

```
fa=function(x1,x2,x3){
  5*x1+2*x2
}
fae=expression(5*x1+2*x2)
D(fae,"x1")
```

```
## [1] 5
```

```
D(fae,"x2")
```

```
## [1] 2
```

```
D(fae,"x3")
```

```
## [1] 0
```

```r
dfa1=function(x1,x2,x3){}
dfa2=function(x1,x2,x3){}
dfa3=function(x1,x2,x3){}

fb=function(x1,x2,x3){

}


fbe=expression()
D(fbe,"x1")
```

```
## [1] NA
```

```r
D(fbe,"x2")
```

```
## [1] NA
```

```r
D(fbe,"x3")
```

```
## [1] NA
```

```r
dfb1=function(x1,x2,x3){}
dfb2=function(x1,x2,x3){}
dfb3=function(x1,x2,x3){}



fc=function(x1,x2,x3){

}


fce=expression()
D(fce,"x1")
```

```
## [1] NA
```

```r
D(fce,"x2")
```

```
## [1] NA
```

```r
D(fce,"x3")
```

```
## [1] NA
```

```r
dfc1=function(x1,x2,x3){}
dfc2=function(x1,x2,x3){}
dfc3=function(x1,x2,x3){}
```

#Matriz jacobiana

```
Jacobiano <- function(x1,x2){
  col1 <-
    c(dfa1(x1,x2),dfa2(x1,x2))

  col2 <-
    c(dfb1(x1,x2),dfb2(x1,x2))


  J <- rbind(col1,col2) #armo la matriz ampliada
  return(J)
}
```

#Definino Fx

```
Fx <- function(x){
  Fx <- rbind(fa(x[1],x[2]), fb(x[1],x[2]))
  return(Fx)
} #sera una matriz ampliada con las funciones definadas antes
```

Evaluo fn y el Jacobiano

```
x <- c(0,0)
n=2
#Sist_Ec_NoLineal_Newton(n, x, 10^-6, 100)
```

Corroboro

```
#Asigno los rdos del algoritmo a las variables x1,x2
#x1 <- Sist_Ec_NoLineal_Newton(n,x, 10^-5, 100)[1] #posicion, osea mult por posicion 1
#x2 <- Sist_Ec_NoLineal_Newton(n,x, 10^-5, 100)[2]
```

Resultados

```
#fa(x1, x2)
#fb(x1, x2)
```