2-2Multivariable Optimization

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R Markdown

This R repository is for demonstration of algorithms involved in the book Mathematical Modeling (4th Edition) written by Prof. Mark. M. Meerschaert

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#This R repository is for demonstration of algorithms involved in the book
#Mathematical Modeling (4th Edition) written by Prof. Mark. M. Meerschaert
#coded, edited and tested by Hao Li during Dec. 2018 - Jan. 2019.

#1-2-2 Multivariable Optimization
#Plot contour with restrictions
#Load results from 1-2-1
#1. SOLVE THE EQUATIONS

(ym=matrix(c((-174),(-144)),ncol=1))
```

```
##      [,1]
## [1,] -174
## [2,] -144
```

```
(B=rbind(c((-0.007),(-0.02)),c((-0.02),-0.007)))
```

```
##        [,1]   [,2]
## [1,] -0.007 -0.020
## [2,] -0.020 -0.007
```

```
x=solve(B,ym)
remove(ym)
remove(B)
x[1]#s
```

```
## [1] 4735.043
```

```
x[2]#t
```

```
## [1] 7042.735
```

```r
y<-function(s,t) (339 - 0.01 * s - 0.003 * t) * s + (399-0.004*s-0.01*t) * t - (195 * s + 225 * t + 4e+
y(x[1],x[2])
```

```
## [1] 553641
```

```r
#Visualization
library(plot3D)
x1=seq(from = 0, to = 10000, length.out = 100);x2=seq(from = 0, to = 10000, length.out = 100)
m = mesh(x=x1,y=x2)
z = y(m$x,m$y)
layout(matrix(1:2,1))

contour(x1,x2,z,xlab='x1',ylab='x2')
abline(v=x[1],untf=FALSE)
abline(h=x[2],untf=FALSE)
title("Contours of f(x1,x2)")
#Add the margins of domain there
abline(h=8000,col = 'red',untf=FALSE)
abline(v=5000,col = 'red',untf=FALSE)
abline(coef=c(10000,-1),col = 'red',untf=FALSE)

persp3D(x1,x2,z)
```