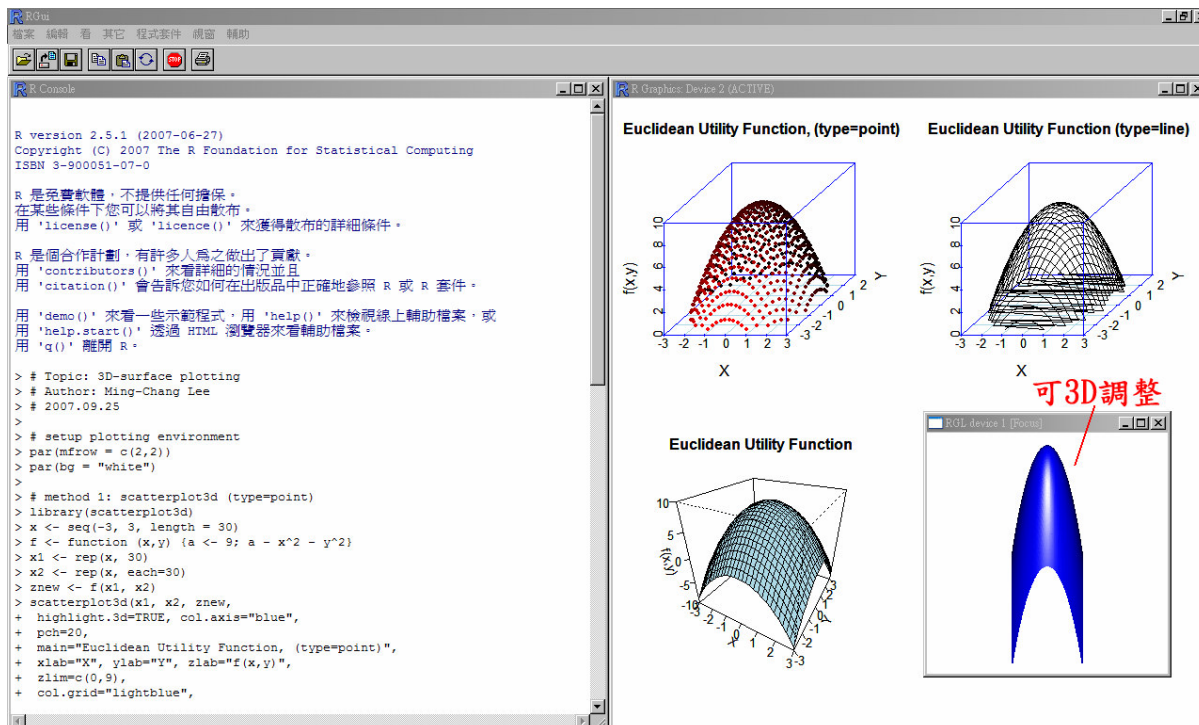Topic: R - 3D surface plotting
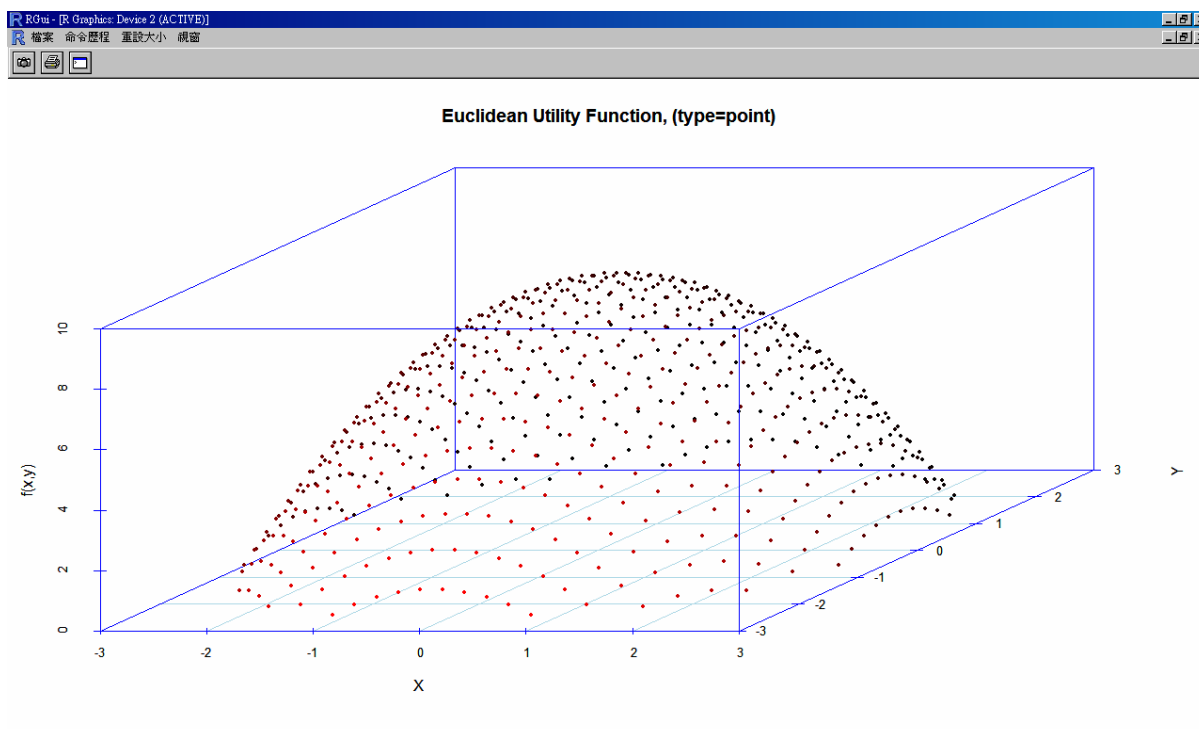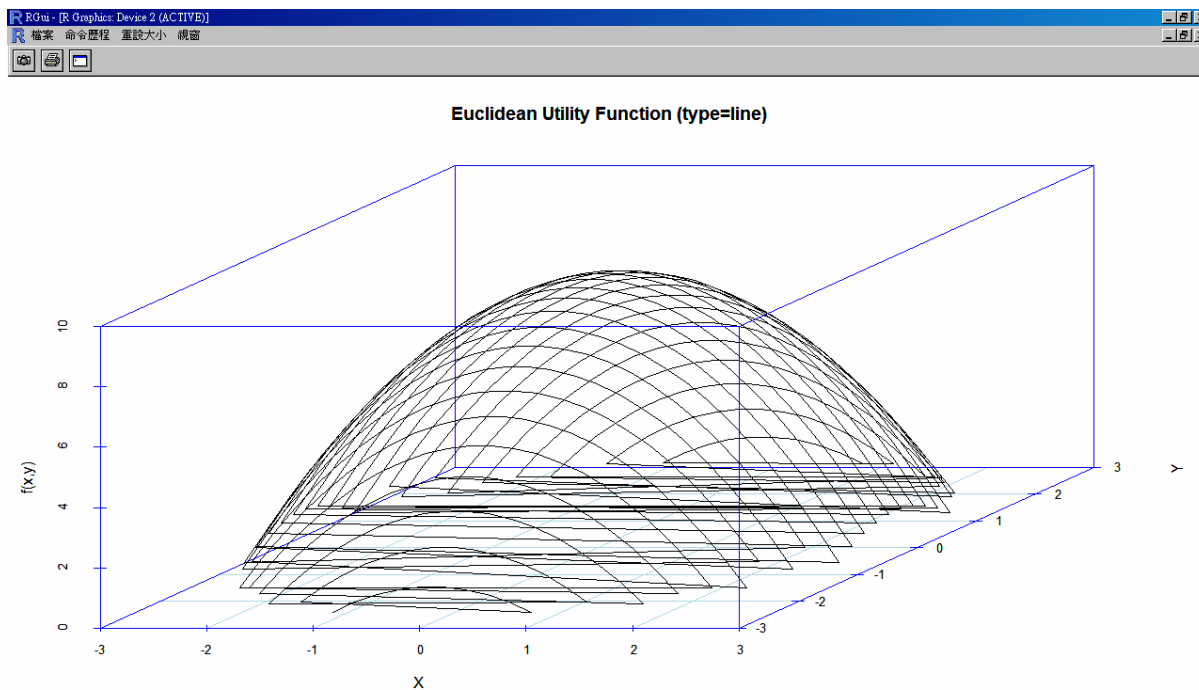
Author: Ming-Change Lee

Date: 2008/1/1

R 執行畫面如下所示：Method 1, 1a, 3 須安裝 scatterplot3d, misc3d 套件。Method 3 可配合滑鼠作 360 度旋轉與檢視。
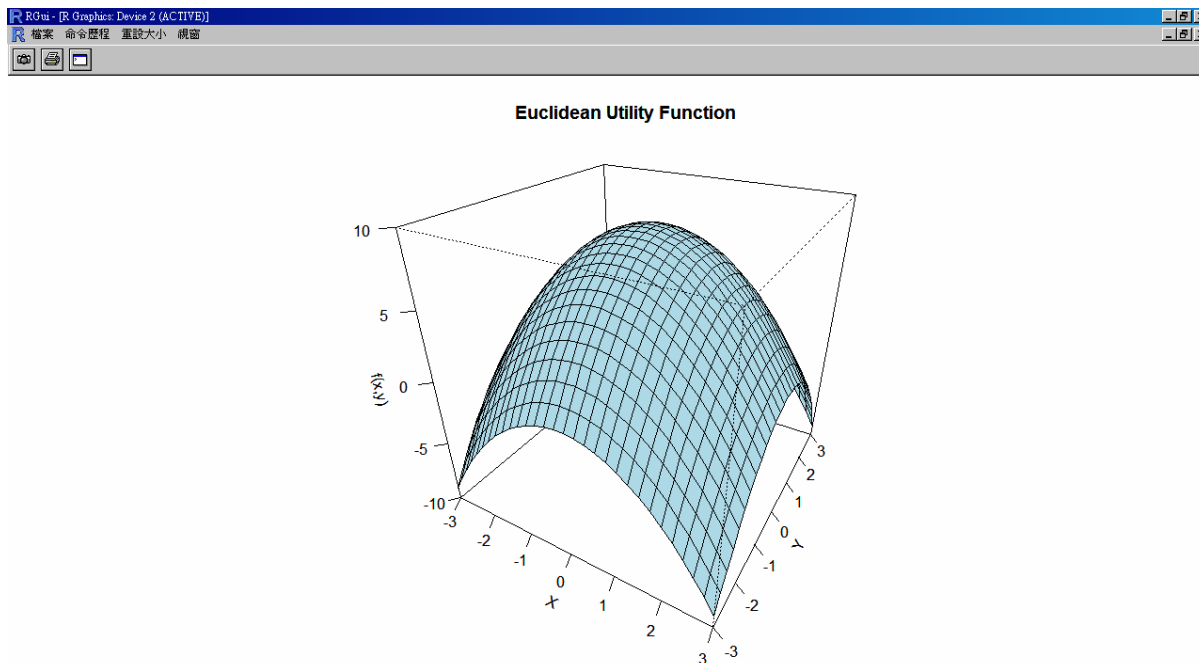

Method 1: scatterplot3d (type=point)

Method 1a: scatterplot3d (type=line)

Method 2: persp

R-codes:

```
# Topic: 3D-surface plotting
# Author: Ming-Chang Lee
# Revised: 2008.01.01

# setup plotting environment
par(mfrow = c(2,2))
par(bg = "white")

# method 1: scatterplot3d (type=point)
library(scatterplot3d)
x <- seq(-3, 3, length = 30)
f <- function (x,y) {a <- 9; a - x^2 - y^2}
x1 <- rep(x, 30)
x2 <- rep(x, each=30)
znew <- f(x1, x2)
scatterplot3d(x1, x2, znew,
  highlight.3d=TRUE, col.axis="blue",
  pch=20,
  main="Euclidean Utility Function, (type=point)",
  xlab="X", ylab="Y", zlab="f(x,y)",
  zlim=c(0,9),
  col.grid="lightblue",
  type="p"
)

# method 1a: scatterplot3d (type=line)
library(scatterplot3d)
x <- seq(-3, 3, length = 30)
f <- function (x,y) {a <- 9; a - x^2 - y^2}
x1 <- rep(x, 30)
x2 <- rep(x, each=30)
znew <- f(x1, x2)
scatterplot3d(x1, x2, znew,
  highlight.3d=TRUE, col.axis="blue",
  pch=20,
  main="Euclidean Utility Function (type=line)",
  xlab="X", ylab="Y", zlab="f(x,y)",
  zlim=c(0,9),
```

```
  col.grid="lightblue",
  type="l"
)


# method 2: persp
x <- seq(-3,3,length = 30)
y <- x
f <- function (x,y) { a <- 9; a-x^2-y^2}
z <- outer(x,y,f)


persp(x,y,z,zlim = range(c(-10:10), na.rm = TRUE), expand=1,theta = 30, phi = 30,
  col = "lightblue",ticktype="detailed", xlab="X", ylab="Y", zlab="f(x,y)",
  main="Euclidean Utility Function")


# method 3: misc3d
library(misc3d)
parametric3d(
  fx = function(u, v) u,
  fy = function(u, v) v,
  fz = function(u, v) -9 - u^2 - v^2 ,
  fill = FALSE,
  color = "blue",
  scale = FALSE,
  umin = -3, umax = 3, vmin = -3, vmax = 3, n = 100)


# setup plotting environment to the default
par(mfrow=c(1,1))
# end
```

--- END ---