```
# This R script is intended to plot single-particle
 diffusion data for the Lagrangian diffusion
# example in my Astrophysical Hydrodynamics class.
# Set the working directory to be the directory where this
 script and the data resides:
setwd("/Users/RenOnly./Downloads/hstoch2datanew")
pdf("hstoch2position.pdf",width=8,height=7,family =
 "Times", pointsize=20)
par(cex = 1.0,mar=c(4.5,5,1,2))

# set simulation parameters
eta= 0.01698623^2
teta= 0.1154128


###### load data
onam=paste("datapos2/time.dat",sep="")
tt<- scan(file =onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/xposition.dat",sep="")
rx<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/yposition.dat",sep="")
ry<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/xposition1.dat",sep="")
```

```
rx1<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/yposition1.dat",sep="")
ry1<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/xposition2.dat",sep="")
rx2<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")

onam=paste("datapos2/yposition2.dat",sep="")
ry2<- scan(file = onam, what = double(0), nmax = -1, dec =
 ".", skip= 0, nlines = 0, na.strings = "NA", flush =
 FALSE, fill = FALSE, strip.white = FALSE, quiet = FALSE,
 blank.lines.skip = TRUE, multi.line = TRUE, comment.char =
 "")


# scale data for plotting
tt<-tt-tt[1]
tt<-tt/teta

# create plot
plot(c(tt,tt,tt,tt,tt,tt),c(rx,ry,rx1,ry1,rx2,ry2),type="n"
 , pch=".", cex.main = 1.,cex.axis=1.,cex.lab=1.,
 main=expression(paste()), ylab
=expression(paste("Particle Positions")),
```

```
xlab = expression(paste("Time")), font=9, col =
 "navajowhite",
font=5, axes=FALSE, frame=TRUE)

lines(tt,rx, type="l", pch=".", cex = .5, lwd=2,col =
 "deepskyblue3")
lines(tt,ry, type="l", pch=".", cex = .5, lwd=2,col =
 "orchid3")

lines(tt,rx1, type="l", pch=".", cex = .5, lwd=2,col =
 "mediumseagreen")
lines(tt,ry1, type="l", pch=".", cex = .5, lwd=2,col =
 "palevioletred1")

lines(tt,rx2, type="l", pch=".", cex = .5, lwd=2,col =
 "gray43")
lines(tt,ry2, type="l", pch=".", cex = .5, lwd=2,col =
 "lightgoldenrodyellow")



legend(.2,-3.5,c("x position","y position","x1 position",
 "y1 position","x2 position", "y2 position"),
 col=c("deepskyblue3","orchid3","mediumseagreen","paleviole
 tred1","gray43","lightgoldenrodyellow"),lty=c("solid","sol
 id","solid","solid","solid","solid"),cex=.
 7,lwd=2,bg="navajowhite")



axis(1, tick=TRUE, lwd=2,cex.axis=1.2)

axis(2, tick=TRUE, lwd=2,cex.axis=1.2)

dev.off()
print(max(tt))
```