#S&P 500 INDEX,RTH (^GSPC)

setwd("E:/program/Rgarch/JSP")

dataR <- read.csv("S&P500\_from\_Jan2006\_to\_Oct2009.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0609\_SAP500.txt",col.names=FALSE,row.names=FALSE)

len.date.R <- length(dataR[,1])

dataRrv.date <- dataR[len.date.R:1,1]

date.R <- rep(0,48)

date.R[1] <- (1:1006)[dataRrv.date[-1]=="2006-01-04"]

date.R[2] <- (1:1006)[dataRrv.date[-1]=="2006-02-01"]

date.R[3] <- (1:1006)[dataRrv.date[-1]=="2006-03-01"]

date.R[4] <- (1:1006)[dataRrv.date[-1]=="2006-04-03"]

date.R[5] <- (1:1006)[dataRrv.date[-1]=="2006-05-01"]

date.R[6] <- (1:1006)[dataRrv.date[-1]=="2006-06-01"]

date.R[7] <- (1:1006)[dataRrv.date[-1]=="2006-07-03"]

date.R[8] <- (1:1006)[dataRrv.date[-1]=="2006-08-01"]

date.R[9] <- (1:1006)[dataRrv.date[-1]=="2006-09-01"]

date.R[10] <- (1:1006)[dataRrv.date[-1]=="2006-10-02"]

date.R[11] <- (1:1006)[dataRrv.date[-1]=="2006-11-01"]

date.R[12] <- (1:1006)[dataRrv.date[-1]=="2006-12-01"]

date.R[13] <- (1:1006)[dataRrv.date[-1]=="2007-01-03"]

date.R[14] <- (1:1006)[dataRrv.date[-1]=="2007-02-01"]

date.R[15] <- (1:1006)[dataRrv.date[-1]=="2007-03-01"]

date.R[16] <- (1:1006)[dataRrv.date[-1]=="2007-04-02"]

date.R[17] <- (1:1006)[dataRrv.date[-1]=="2007-05-01"]

date.R[18] <- (1:1006)[dataRrv.date[-1]=="2007-06-01"]

date.R[19] <- (1:1006)[dataRrv.date[-1]=="2007-07-02"]

date.R[20] <- (1:1006)[dataRrv.date[-1]=="2007-08-01"]

date.R[21] <- (1:1006)[dataRrv.date[-1]=="2007-09-04"]

date.R[22] <- (1:1006)[dataRrv.date[-1]=="2007-10-01"]

date.R[23] <- (1:1006)[dataRrv.date[-1]=="2007-11-01"]

date.R[24] <- (1:1006)[dataRrv.date[-1]=="2007-12-03"]

date.R[25] <- (1:1006)[dataRrv.date[-1]=="2008-01-02"]

date.R[26] <- (1:1006)[dataRrv.date[-1]=="2008-02-01"]

date.R[27] <- (1:1006)[dataRrv.date[-1]=="2008-03-03"]

date.R[28] <- (1:1006)[dataRrv.date[-1]=="2008-04-01"]

date.R[29] <- (1:1006)[dataRrv.date[-1]=="2008-05-01"]

date.R[30] <- (1:1006)[dataRrv.date[-1]=="2008-06-02"]

date.R[31] <- (1:1006)[dataRrv.date[-1]=="2008-07-01"]

date.R[32] <- (1:1006)[dataRrv.date[-1]=="2008-08-01"]

date.R[33] <- (1:1006)[dataRrv.date[-1]=="2008-09-02"]

date.R[34] <- (1:1006)[dataRrv.date[-1]=="2008-10-01"]

date.R[35] <- (1:1006)[dataRrv.date[-1]=="2008-11-03"]

date.R[36] <- (1:1006)[dataRrv.date[-1]=="2008-12-01"]

date.R[37] <- (1:1006)[dataRrv.date[-1]=="2009-01-02"]

date.R[38] <- (1:1006)[dataRrv.date[-1]=="2009-02-02"]

date.R[39] <- (1:1006)[dataRrv.date[-1]=="2009-03-02"]

date.R[40] <- (1:1006)[dataRrv.date[-1]=="2009-04-01"]

date.R[41] <- (1:1006)[dataRrv.date[-1]=="2009-05-01"]

date.R[42] <- (1:1006)[dataRrv.date[-1]=="2009-06-01"]

date.R[43] <- (1:1006)[dataRrv.date[-1]=="2009-07-01"]

date.R[44] <- (1:1006)[dataRrv.date[-1]=="2009-08-03"]

date.R[45] <- (1:1006)[dataRrv.date[-1]=="2009-09-01"]

date.R[46] <- (1:1006)[dataRrv.date[-1]=="2009-10-01"]

date.R[47] <- (1:1006)[dataRrv.date[-1]=="2009-11-02"]

date.R[48] <- (1:1006)[dataRrv.date[-1]=="2009-12-01"]

plot(Return.R,type="l",xaxt="n",ylab="",xlab="",xaxs="i",bty="o")

points(Return.R,type="p",pch=16,cex=.5)

axis(1,at=date.R[0:20\*3+1],labels=date.X[0:20\*3+1],tck=0.01,padj=-1.2,cex.axis=1.2)

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0609\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0609\_SAP500\_8DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0609\_SAP500\_8IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0609\_SAP500\_8PD\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

Nlist <- 900:1000

par(mar=c(2,2,0.1,0.1))

date.R

date.X <- c(

paste(c(rep(0,9),rep("",3)),1:12,"/","06",sep=""),

paste(c(rep(0,9),rep("",3)),1:12,"/","07",sep=""),

paste(c(rep(0,9),rep("",3)),1:12,"/","08",sep=""),

paste(c(rep(0,9),rep("",3)),1:12,"/","09",sep=""))

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=1,lwd=2,lty=1)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=4,lwd=2,lty=4)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=5,lwd=2,lty=5)

axis(1,at=date.R[0:20\*3+1],labels=date.X[0:20\*3+1],tck=0.01,padj=-1.2,cex.axis=1.2)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1,cex.axis=1.2)

setwd("E:/program/garchMHnov/")

savePlot("SAP500\_0609\_Sigma3",type="pdf")

setwd("E:/program/garchMHnov/output")

predDP <- read.table("RData\_0609\_SAP500\_8DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0609\_SAP500\_8IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0609\_SAP500\_8PD\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0609\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(2,2,0.1,0.1))

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=1,lwd=2,lty=1)

lines(predDP,type="l",col=5,lwd=2,lty=5)

lines(predPD,type="l",col=2,lwd=2,lty=2)

lines(predIG,type="l",col=4,lwd=2,lty=4)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-1.2,cex.axis=1.2)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1,cex.axis=1.2)

setwd("E:/program/garchMHnov/")

savePlot("SAP500\_0609\_Predictive3",type="pdf")

setwd("D:/program/garchMHnov/data/")

setwd("E:/program/garchMHnov/data/")

data0 <- read.table("RData\_0609\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

setwd("E:/program/garchMHnov/output")

avepDP <- read.table("RData\_0609\_SAP500\_8DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0609\_SAP500\_8IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0609\_SAP500\_8PD\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=1,lwd=2,lty=1)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=4,lwd=2,lty=4)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=5,lwd=2,lty=5)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.0,c( "y",

"No mixture-GARCH(1,1) ",

"DP-GARCH(1,1)",

"PD-GARCH(1,1)",

"NGG-GARCH(1,1)"),

lty=c(1,1,5,2,4),col=c("grey",1,5,2,4),cex=1,bty="n",ncol=3,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Sigma2",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0609\_SAP500\_8DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0609\_SAP500\_8IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0609\_SAP500\_8PD\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0609\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=1,lwd=2,lty=1)

lines(predDP,type="l",col=5,lwd=2,lty=5)

lines(predPD,type="l",col=2,lwd=2,lty=2)

lines(predIG,type="l",col=4,lwd=2,lty=4)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1,c( "No mixture-GARCH(1,1) ",

"DP-GARCH(1,1)",

"PD-GARCH(1,1)",

"NGG-GARCH(1,1)"),

lty=c(1,5,2,4),col=c(1,5,2,4),cex=1,bty="n",ncol=3,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Predictive2",type="pdf")

calll <- function(avep) {

Loglikelihood <- (-1) \* avep[1,]

for (i in 2:10000) {

diff0 <- Loglikelihood - (-1) \* avep[i,]

if (diff0>0) { Loglikelihood <- (-1) \* avep[i,] + log(1+exp(-diff0)) }

else { Loglikelihood <- Loglikelihood + log(1+exp(diff0)) }

}

return (-Loglikelihood+log(10000))

}

setwd("D:/program/garchMHnov/output")

calll(read.table("RData\_0609\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

calll(read.table("RData\_0609\_SAP500\_7DP\_00\_XXXlikelihood.txt.gz"))

calll(read.table("RData\_0609\_SAP500\_7PD\_00\_XXXlikelihood.txt.gz"))

calll(read.table("RData\_0609\_SAP500\_7IG\_00\_XXXlikelihood.txt.gz"))

> calll(read.table("RData\_0609\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

[1] -1578.085

> calll(read.table("RData\_0609\_SAP500\_7DP\_00\_XXXlikelihood.txt.gz"))

[1] -1493.267

> calll(read.table("RData\_0609\_SAP500\_7PD\_00\_XXXlikelihood.txt.gz"))

[1] -1478.036

> calll(read.table("RData\_0609\_SAP500\_7IG\_00\_XXXlikelihood.txt.gz"))

[1] -1431.166

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0609\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0609\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0609\_SAP500\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0609\_SAP500\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("RData\_0609\_SAP500\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=1,lwd=2,lty=1)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=4,lwd=2,lty=4)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.0,c( "y",

"No mixture-GARCH(1,1) ",

"PD-GARCH(1,1)",

"NGG-GARCH(1,1)"),

lty=c(1,1,2,4),col=c("grey",1,2,4),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Sigma1",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0609\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0609\_SAP500\_2IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0609\_SAP500\_2PD\_00\_XXXpred.txt.gz")

predNS <- read.table("RData\_0609\_SAP500\_2NS\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0609\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=1,lwd=2,lty=1)

lines(predPD,type="l",col=2,lwd=2,lty=2)

lines(predIG,type="l",col=4,lwd=2,lty=4)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1,c( "No mixture-GARCH(1,1) ",

"PD-GARCH(1,1)",

"NGG-GARCH(1,1)"),

lty=c(1,2,4),col=c(1,2,4),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Predictive1",type="pdf")

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("E:/program/garchMHnov/data/S&P500\_from\_Jan2006\_to\_Oct2009.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0609\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

len.date.R <- length(dataR[,1])

dataRrv.date <- dataR[len.date.R:1,1]

date.R <- rep(0,48)

date.R[1] <- (1:1006)[dataRrv.date[-1]=="2006-01-04"]

date.R[2] <- (1:1006)[dataRrv.date[-1]=="2006-02-01"]

date.R[3] <- (1:1006)[dataRrv.date[-1]=="2006-03-01"]

date.R[4] <- (1:1006)[dataRrv.date[-1]=="2006-04-03"]

date.R[5] <- (1:1006)[dataRrv.date[-1]=="2006-05-01"]

date.R[6] <- (1:1006)[dataRrv.date[-1]=="2006-06-01"]

date.R[7] <- (1:1006)[dataRrv.date[-1]=="2006-07-03"]

date.R[8] <- (1:1006)[dataRrv.date[-1]=="2006-08-01"]

date.R[9] <- (1:1006)[dataRrv.date[-1]=="2006-09-01"]

date.R[10] <- (1:1006)[dataRrv.date[-1]=="2006-10-02"]

date.R[11] <- (1:1006)[dataRrv.date[-1]=="2006-11-01"]

date.R[12] <- (1:1006)[dataRrv.date[-1]=="2006-12-01"]

date.R[13] <- (1:1006)[dataRrv.date[-1]=="2007-01-03"]

date.R[14] <- (1:1006)[dataRrv.date[-1]=="2007-02-01"]

date.R[15] <- (1:1006)[dataRrv.date[-1]=="2007-03-01"]

date.R[16] <- (1:1006)[dataRrv.date[-1]=="2007-04-02"]

date.R[17] <- (1:1006)[dataRrv.date[-1]=="2007-05-01"]

date.R[18] <- (1:1006)[dataRrv.date[-1]=="2007-06-01"]

date.R[19] <- (1:1006)[dataRrv.date[-1]=="2007-07-02"]

date.R[20] <- (1:1006)[dataRrv.date[-1]=="2007-08-01"]

date.R[21] <- (1:1006)[dataRrv.date[-1]=="2007-09-04"]

date.R[22] <- (1:1006)[dataRrv.date[-1]=="2007-10-01"]

date.R[23] <- (1:1006)[dataRrv.date[-1]=="2007-11-01"]

date.R[24] <- (1:1006)[dataRrv.date[-1]=="2007-12-03"]

date.R[25] <- (1:1006)[dataRrv.date[-1]=="2008-01-02"]

date.R[26] <- (1:1006)[dataRrv.date[-1]=="2008-02-01"]

date.R[27] <- (1:1006)[dataRrv.date[-1]=="2008-03-03"]

date.R[28] <- (1:1006)[dataRrv.date[-1]=="2008-04-01"]

date.R[29] <- (1:1006)[dataRrv.date[-1]=="2008-05-01"]

date.R[30] <- (1:1006)[dataRrv.date[-1]=="2008-06-02"]

date.R[31] <- (1:1006)[dataRrv.date[-1]=="2008-07-01"]

date.R[32] <- (1:1006)[dataRrv.date[-1]=="2008-08-01"]

date.R[33] <- (1:1006)[dataRrv.date[-1]=="2008-09-02"]

date.R[34] <- (1:1006)[dataRrv.date[-1]=="2008-10-01"]

date.R[35] <- (1:1006)[dataRrv.date[-1]=="2008-11-03"]

date.R[36] <- (1:1006)[dataRrv.date[-1]=="2008-12-01"]

date.R[37] <- (1:1006)[dataRrv.date[-1]=="2009-01-02"]

date.R[38] <- (1:1006)[dataRrv.date[-1]=="2009-02-02"]

date.R[39] <- (1:1006)[dataRrv.date[-1]=="2009-03-02"]

date.R[40] <- (1:1006)[dataRrv.date[-1]=="2009-04-01"]

date.R[41] <- (1:1006)[dataRrv.date[-1]=="2009-05-01"]

date.R[42] <- (1:1006)[dataRrv.date[-1]=="2009-06-01"]

date.R[43] <- (1:1006)[dataRrv.date[-1]=="2009-07-01"]

date.R[44] <- (1:1006)[dataRrv.date[-1]=="2009-08-03"]

date.R[45] <- (1:1006)[dataRrv.date[-1]=="2009-09-01"]

date.R[46] <- (1:1006)[dataRrv.date[-1]=="2009-10-01"]

date.R[47] <- (1:1006)[dataRrv.date[-1]=="2009-11-02"]

date.R[48] <- (1:1006)[dataRrv.date[-1]=="2009-12-01"]

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2006\_to\_Oct2009.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0609\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

####################### 06-09

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0609\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0609\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0609\_SAP500\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0609\_SAP500\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("RData\_0609\_SAP500\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=4,lwd=2,lty=1)

lines(Nlist,sqrt(avepDP[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=3,lwd=2,lty=3)

lines(Nlist,sqrt(avepNS[Nlist,1]),type="l",col=5,lwd=2,lty=4)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "y",

"No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,1,2,3,4,5),col=c("grey",4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Sigma",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0609\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0609\_SAP500\_2IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0609\_SAP500\_2PD\_00\_XXXpred.txt.gz")

predNS <- read.table("RData\_0609\_SAP500\_2NS\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0609\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=4,lwd=2,lty=1)

lines(predDP,type="l",col=2,lwd=2,lty=2)

lines(predPD,type="l",col=3,lwd=2,lty=3)

lines(predNS,type="l",col=5,lwd=2,lty=4)

lines(predIG,type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,2,3,4,5),col=c(4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0609\_Predictive",type="pdf")

####################### 05-08

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0508\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0508\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0508\_SAP500\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0508\_SAP500\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("RData\_0508\_SAP500\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0508\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=4,lwd=2,lty=1)

lines(Nlist,sqrt(avepDP[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=3,lwd=2,lty=3)

lines(Nlist,sqrt(avepNS[Nlist,1]),type="l",col=5,lwd=2,lty=4)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "y",

"No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,1,2,3,4,5),col=c("grey",4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0508\_Sigma",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0508\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0508\_SAP500\_2IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0508\_SAP500\_2PD\_00\_XXXpred.txt.gz")

predNS <- read.table("RData\_0508\_SAP500\_2NS\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0508\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=4,lwd=2,lty=1)

lines(predDP,type="l",col=2,lwd=2,lty=2)

lines(predPD,type="l",col=3,lwd=2,lty=3)

lines(predNS,type="l",col=5,lwd=2,lty=4)

lines(predIG,type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,2,3,4,5),col=c(4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0508\_Predictive",type="pdf")

####################### 04-07

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0407\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0407\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0407\_SAP500\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0407\_SAP500\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("RData\_0407\_SAP500\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0407\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=4,lwd=2,lty=1)

lines(Nlist,sqrt(avepDP[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=3,lwd=2,lty=3)

lines(Nlist,sqrt(avepNS[Nlist,1]),type="l",col=5,lwd=2,lty=4)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "y",

"No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,1,2,3,4,5),col=c("grey",4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0407\_Sigma",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0407\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0407\_SAP500\_2IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0407\_SAP500\_2PD\_00\_XXXpred.txt.gz")

predNS <- read.table("RData\_0407\_SAP500\_2NS\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0407\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=4,lwd=2,lty=1)

lines(predDP,type="l",col=2,lwd=2,lty=2)

lines(predPD,type="l",col=3,lwd=2,lty=3)

lines(predNS,type="l",col=5,lwd=2,lty=4)

lines(predIG,type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,2,3,4,5),col=c(4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0407\_Predictive",type="pdf")

####################### 03-06

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("RData\_0306\_SAP500.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("RData\_0306\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("RData\_0306\_SAP500\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("RData\_0306\_SAP500\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("RData\_0306\_SAP500\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("RData\_0306\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(Nlist,data0[Nlist,1],type="h",col="grey",lwd=2,lty=1,ylim=c(0,10),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,sqrt(avepST[Nlist,1]),type="l",col=4,lwd=2,lty=1)

lines(Nlist,sqrt(avepDP[Nlist,1]),type="l",col=2,lwd=2,lty=2)

lines(Nlist,sqrt(avepPD[Nlist,1]),type="l",col=3,lwd=2,lty=3)

lines(Nlist,sqrt(avepNS[Nlist,1]),type="l",col=5,lwd=2,lty=4)

lines(Nlist,sqrt(avepIG[Nlist,1]),type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(0,2000,50)),labels=c(seq(0,2000,50)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-50,50,1)),labels=c(seq(-50,50,1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "y",

"No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,1,2,3,4,5),col=c("grey",4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0306\_Sigma",type="pdf")

setwd("D:/program/garchMHnov/output")

predDP <- read.table("RData\_0306\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predIG <- read.table("RData\_0306\_SAP500\_2IG\_00\_XXXpred.txt.gz")

predPD <- read.table("RData\_0306\_SAP500\_2PD\_00\_XXXpred.txt.gz")

predNS <- read.table("RData\_0306\_SAP500\_2NS\_00\_XXXpred.txt.gz")

predST <- read.table("RData\_0306\_SAP500\_2ST\_00\_onepred.txt.gz")

windows(width=12,height=8)

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2),2,1,byrow=TRUE),heights=c(8,1),TRUE)

plot(c(0,0),type="l",col=4,xlim=c(-5,5),ylim=c(0,0.8),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

#mtext(expression(y[n+1]),side=1,line=2)

#mtext(paste("Estimated Predictive Density of given " ),side=2,line=2)

#mtext(expression(y[n+1]),side=2,line=2,adj=.66)

#mtext(expression(y[1]~...~y[n]),side=2,line=2,adj=.87)

lines(predST,type="l",col=4,lwd=2,lty=1)

lines(predDP,type="l",col=2,lwd=2,lty=2)

lines(predPD,type="l",col=3,lwd=2,lty=3)

lines(predNS,type="l",col=5,lwd=2,lty=4)

lines(predIG,type="l",col=6,lwd=2,lty=5)

axis(1,at=c(seq(-10,10,1)),labels=c(seq(-10,10,1)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,2,.1)),labels=c(seq(0,2,.1)),tck=0.01,padj=1.7,cex.axis=.6)

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,2,3,4,5),col=c(4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("SAP500\_0306\_Predictive",type="pdf")

#######################

calll <- function(avep) {

Loglikelihood <- (-1) \* avep[1,]

for (i in 2:10000) {

diff0 <- Loglikelihood - (-1) \* avep[i,]

if (diff0>0) { Loglikelihood <- (-1) \* avep[i,] + log(1+exp(-diff0)) }

else { Loglikelihood <- Loglikelihood + log(1+exp(diff0)) }

}

return (-Loglikelihood+log(10000))

}

setwd("D:/program/garchMHnov/output")

ML<-matrix(rep(0,4\*5),5,4)

ML[1,1]<-calll(read.table("RData\_0609\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

ML[2,1]<-calll(read.table("RData\_0609\_SAP500\_2DP\_00\_XXXlikelihood.txt.gz"))

ML[3,1]<-calll(read.table("RData\_0609\_SAP500\_2PD\_00\_XXXlikelihood.txt.gz"))

ML[4,1]<-calll(read.table("RData\_0609\_SAP500\_2NS\_00\_XXXlikelihood.txt.gz"))

ML[5,1]<-calll(read.table("RData\_0609\_SAP500\_2IG\_00\_XXXlikelihood.txt.gz"))

ML[1,2]<-calll(read.table("RData\_0508\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

ML[2,2]<-calll(read.table("RData\_0508\_SAP500\_2DP\_00\_XXXlikelihood.txt.gz"))

ML[3,2]<-calll(read.table("RData\_0508\_SAP500\_2PD\_00\_XXXlikelihood.txt.gz"))

ML[4,2]<-calll(read.table("RData\_0508\_SAP500\_2NS\_00\_XXXlikelihood.txt.gz"))

ML[5,2]<-calll(read.table("RData\_0508\_SAP500\_2IG\_00\_XXXlikelihood.txt.gz"))

ML[1,3]<-calll(read.table("RData\_0407\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

ML[2,3]<-calll(read.table("RData\_0407\_SAP500\_2DP\_00\_XXXlikelihood.txt.gz"))

ML[3,3]<-calll(read.table("RData\_0407\_SAP500\_2PD\_00\_XXXlikelihood.txt.gz"))

ML[4,3]<-calll(read.table("RData\_0407\_SAP500\_2NS\_00\_XXXlikelihood.txt.gz"))

ML[5,3]<-calll(read.table("RData\_0407\_SAP500\_2IG\_00\_XXXlikelihood.txt.gz"))

ML[1,4]<-calll(read.table("RData\_0306\_SAP500\_2ST\_00\_onelikelihood.txt.gz"))

ML[2,4]<-calll(read.table("RData\_0306\_SAP500\_2DP\_00\_XXXlikelihood.txt.gz"))

ML[3,4]<-calll(read.table("RData\_0306\_SAP500\_2PD\_00\_XXXlikelihood.txt.gz"))

ML[4,4]<-calll(read.table("RData\_0306\_SAP500\_2NS\_00\_XXXlikelihood.txt.gz"))

ML[5,4]<-calll(read.table("RData\_0306\_SAP500\_2IG\_00\_XXXlikelihood.txt.gz"))

0609 0508 0407 0306

No mixture -1578.085 -1384.087 -1110.2826 -1133.3887

DP -1492.086 -1281.530 -1017.9099 -1063.0443

PD -1446.275 -1232.810 -950.9967 -989.7167

NS -1441.841 -1213.663 -919.4039 -989.6478

IG -1442.269 -1204.320 -924.2914 -1006.4578

setwd("D:/program/garchMHnov/data/")

data0 <- read.table("dataFU\_00full.txt")

setwd("D:/program/garchMHnov/output")

avepDP <- read.table("dataFU\_2DP\_00\_XXXave\_para.txt.gz")

avepIG <- read.table("dataFU\_2IG\_00\_XXXave\_para.txt.gz")

avepPD <- read.table("dataFU\_2PD\_00\_XXXave\_para.txt.gz")

avepNS <- read.table("dataFU\_2NS\_00\_XXXave\_para.txt.gz")

avepST <- read.table("dataFU\_2ST\_00\_oneave\_para.txt.gz")

windows(width=12,height=8)

Nlist <- 1:dim(data0)[1]

par(mar=c(0.7,1,0.1,0.1))

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,abs(data0[range0,2]),col="grey",type="h",lty=1,lwd=3,xlim=c(min(range0),max(range0)),ylim=c(0,20),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n")

lines(range0,sqrt(data0[range0,5]),col=1,type="l",lty=2,lwd=2)

lines(range0,sqrt(avepST[range0,1]),col=4,type="l",lty=1,lwd=2)

lines(range0,sqrt(avepDP[range0,1]),col=2,type="l",lty=1,lwd=2)

lines(range0,sqrt(avepPD[range0,1]),col=3,type="l",lty=1,lwd=2)

lines(range0,sqrt(avepNS[range0,1]),col=5,type="l",lty=1,lwd=2)

lines(range0,sqrt(avepIG[range0,1]),col=6,type="l",lty=1,lwd=2)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-1000,1000,20)),labels=c(seq(-1000,1000,20)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c( "true",

"No mixture-GARCH(1,1) ",

"DP(theta=1)-GARCH(1,1) ",

"PD(alpha=1/2,theta=1)-GARCH(1,1)",

"NS(alpha=1/2)=NGG(alpha=1/2,beta=0)-GARCH(1,1)",

"NGG(alpha=1/2,beta=0.0829)-GARCH(1,1)"),

lty=c(1,1,2,3,4,5),col=c(1,4,2,3,5,6),cex=1,bty="n",ncol=2,lwd=2)

setwd("D:/program/garchMHnov/")

savePlot("sim\_Sigma",type="pdf")

legend(0,1.2,c( "No mixture GARCH(1,1) ",

"DP GARCH(1,1) ",

"PD GARCH(1,1)",

"NS GARCH(1,1)",

"IG GARCH(1,1)",

"True"),

lty=c(1,2,2,2,2,2),col=c(4,2,3,5,6,1),cex=1.2,bty="n",ncol=3,lwd=1.5)

calll <- function(avep) {

Loglikelihood <- (-1) \* avep[1,]

for (i in 2:10000) {

diff0 <- Loglikelihood - (-1) \* avep[i,]

if (diff0>0) { Loglikelihood <- (-1) \* avep[i,] + log(1+exp(-diff0)) }

else { Loglikelihood <- Loglikelihood + log(1+exp(diff0)) }

}

return (-Loglikelihood+log(10000))

}

avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2DP\_00\_XXXlikelihood.txt.gz")

calll(avepX)

avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2IG\_00\_XXXlikelihood.txt.gz")

calll(avepX)

avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2PD\_00\_XXXlikelihood.txt.gz")

calll(avepX)

avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2NS\_00\_XXXlikelihood.txt.gz")

calll(avepX)

avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2ST\_00\_onelikelihood.txt.gz")

calll(avepX)

> avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2DP\_00\_XXXlikelihood.txt.gz")

> calll(avepX)

[1] -2204.820

> avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2IG\_00\_XXXlikelihood.txt.gz")

> calll(avepX)

[1] -2225.959

> avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2PD\_00\_XXXlikelihood.txt.gz")

> calll(avepX)

[1] -2211.645

> avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2NS\_00\_XXXlikelihood.txt.gz")

> calll(avepX)

[1] -2238.462

> avepX <- read.table("D:/program/garchMHnov/output/dataFU\_2ST\_00\_onelikelihood.txt.gz")

> calll(avepX)

[1] -2443.964

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2006\_to\_Oct2009.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0609\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2005\_to\_Dec2008.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0508\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2004\_to\_Dec2007.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0407\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2003\_to\_Dec2006.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0306\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2002\_to\_Dec2005.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0205\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

length(Return.R)

n <- 10000

x <- rep(0,n)

x[1] <- 1

for (i in 2:n) {

y <- exp(log(x[i-1])+rnorm(1,0,1))

acc <- min(dgamma(y,2,1)/dgamma(x[i-1],2,1)\*y/x[i-1],1)

if (runif(1)<acc) { x[i] <- y }

else { x[i] <- x[i-1] }

}

#x<-rgamma(10000,2,1)

hist(x,br=seq(0,100,.1),freq=F,xlim=c(0,5))

lines(seq(0,5,.05),dgamma(seq(0,5,.05),2,1))

n <- 20000

x <- rep(0,n)

s1 <- rep(0,n)

x[1] <- 1

for (i in 2:n) {

s1[i] <- sd(log(x[1:(i-1)]))

if (i<n/2) { y <- exp(log(x[i-1])+rnorm(1,0,.2)) }

else { y <- exp(log(x[i-1])+rnorm(1,0,s1[i])) }

acc <- min(dgamma(y,2,1)/dgamma(x[i-1],2,1)\*y/x[i-1],1)

if (runif(1)<acc) { x[i] <- y }

else { x[i] <- x[i-1] }

}

par(mfrow=c(2,1))

plot(x,type="l")

#x<-rgamma(10000,2,1)

hist(x[(n/2+1):n],br=seq(0,100,.1),freq=F,xlim=c(0,8))

lines(seq(0,8,.05),dgamma(seq(0,8,.05),2,1))

data0 <- read.table("E:/program/garchMHnov/data/RData\_0609\_SAP500.txt")

avepX <- read.table("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2DP\_00\_XXXave\_para.txt.gz")

avepO <- read.table("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz")

avepX <- read.table(gzfile("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2DP\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz"))

#data0 <- read.table("D:/program/garchMHnov/data/RData\_0609\_SAP500.txt")

#avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_DP\_00\_XXXave\_para.txt.gz"))

#avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_2ST\_00\_oneave\_para.txt.gz"))

#avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_NS\_00\_XXXave\_para.txt.gz"))

#avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_IG\_00\_XXXave\_para.txt.gz"))

#avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_PD\_00\_XXXave\_para.txt.gz"))

#avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_ST\_00\_oneave\_para.txt.gz"))

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0.1,0.1))

plot(Nlist,data0[Nlist,1]^2,type="h",col="grey",lwd=2,lty=1,ylim=c(0,80),xlim=c(min(Nlist),max(Nlist)),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",bty="o")

lines(Nlist,data0[Nlist,1],type="h",col="black",lwd=2,lty=1)

lines(Nlist,avepO[Nlist,1],type="l",col=4,lwd=1.5,lty=12)

lines(Nlist,avepX[Nlist,1],type="l",col=2,lwd=1.5,lty=1)

axis(1,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0,padj=-2,cex.axis=.7)

axis(4,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

predXDP <- read.table("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2DP\_00\_XXXpred.txt.gz")

predXST <- read.table("E:/program/garchMHnov/output/RData\_0609\_SAP500\_2ST\_00\_onepred.txt.gz")

plot(predXDP,type="l",col=2,xlim=c(-3,3))

lines(predXST,type="l",col=3,xlim=c(-3,3))

predXPD <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_PD\_00\_XXXpred.txt.gz"))

predXNS <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_NS\_00\_XXXpred.txt.gz"))

predXIG <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_IG\_00\_XXXpred.txt.gz"))

plot(predXDP,type="l",col=2)

lines(predXPD,type="l",col=3)

lines(predXNS,type="l",col=4)

lines(predXIG,type="l",col=5)

l4st\_ch4nce

###########################################################################################

data0 <- read.table("E:/program/garchMHnov/data/dataFT\_00.txt")

avepX <- read.table(gzfile("E:/program/garchMHnov/output/dataFT\_2\_00\_XXXave\_para.txt.gz"))

predX <- read.table("E:/program/garchMHnov/output/dataFT\_2\_00\_XXXpred.txt.gz")

predO <- read.table("E:/program/garchMHnov/output/dataFT\_2\_00\_onepred.txt.gz")

#pred <- read.table("D:/program/garchMHnov/output/dataFT\_2\_00\_XXXpred.txt.gz")

plot(predX,type="l",col=4)

lines(predO,type="l",col=2)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,abs(data0[range0,2])^2,col="grey",type="h",lty=1,lwd=3,xlim=c(min(range0),max(range0)),ylim=c(0,50),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n")

lines(range0,data0[range0,5],col=3,type="l",lty=2,lwd=2)

lines(range0,avepX[range0,1],col=4,type="l",lty=1,lwd=2)

lines(range0,avepO[range0,1],col=2,type="l",lty=1,lwd=2)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-1000,1000,20)),labels=c(seq(-1000,1000,20)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,sqrt(data0[range0,5]),col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(0,15),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,2],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,data0[range0,4],col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(-1,1),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,3],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

plot(1:1000,data0[1:1000,5],type="h",col=4,ylim=c(0,20))

lines(1:1000,avepX[1:1000,1],type="l",col=2,lwd=1.5)

data0 <- read.table("E:/program/garchMHnov/data/dataFT\_00.txt")

data0[1:1000,]

Nlist <- 1:500

plot(Nlist,data0[Nlist,2],type="l",ylim=c(-10,10))

lines(Nlist,data0[Nlist,4],col=2)

lines(Nlist,sqrt(data0[Nlist,5]),col=4)

lines(Nlist,data0[Nlist,2]\*data0[Nlist,2],col=5)

plot(Nlist,data0[Nlist,2]\*data0[Nlist,2],type="h",ylim=c(0,50))

lines(Nlist,sqrt(data0[Nlist,5]),col=2,lwd=1.5)

windows(width=25,height=10)

draw0 <- function(data0,avep0,avepX) {

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0.1,0.1))

plot(Nlist,data0[Nlist,1]^2,type="h",col="grey",ylim=c(0,70),xlim=c(0,1006),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

lines(Nlist,avepO[Nlist,1],type="l",col=4,lwd=1.5,lty=12)

lines(Nlist,avepX[Nlist,1],type="l",col=2,lwd=1.5,lty=1)

axis(1,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0,padj=-2,cex.axis=.7)

axis(4,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

}

data0 <- read.table("D:/program/garchMHnov/data/RData\_0609\_SAP500.txt")

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_DP\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_PD\_00\_XXXave\_para.txt.gz"))

draw0(data0,avep0,avepX)

avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_ST\_00\_oneave\_para.txt.gz"))

savePlot("D:/recentfiles/GARCH/h2\_SAP100",type="pdf")

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan2006\_to\_Oct2009.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_0609\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

len.R <- length(dataR[1:207,7])

dataRrv <- dataR[207:1,7]

Return.R <- 100\*(log(dataRrv[-1])-log(dataRrv[-len.R]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_SAP500.txt",col.names=FALSE,row.names=FALSE)

plot(Return.R,type="l")

points(Return.R,type="p",pch=16,cex=.5)

dataR[1,1]

dataR[len.R,1]

len.R

####### TEST ##############################################################################

data0 <- read.table("D:/program/garchMHnov/data/dataFS\_00full.txt")

Nlist <- 1:500

plot(Nlist,data0[Nlist,2],type="l",ylim=c(-10,10))

lines(Nlist,data0[Nlist,4],col=2)

lines(Nlist,sqrt(data0[Nlist,5]),col=4)

lines(Nlist,data0[Nlist,2]\*data0[Nlist,2],col=5)

plot(Nlist,data0[Nlist,2]\*data0[Nlist,2],type="h",ylim=c(0,50))

lines(Nlist,sqrt(data0[Nlist,5]),col=2,lwd=1.5)

acf(data0[Nlist,2])

pacf(data0[Nlist,2])

acf(data0[Nlist,2]\*data0[Nlist,2])

pacf(data0[Nlist,2]\*data0[Nlist,2])

plot(exp(cumsum(data0[Nlist,2])),type="l")

alpha.0 <- 3

beta.0 <- 1

x <- rep(1,5000)

for (i in 2:5000) {

E <- rnorm(1,0,3)

xnew <- x[i-1] \* exp(E)

xold <- x[i-1]

oldlnpost <- (alpha.0)\*log(beta.0)+(alpha.0-1.0)\*log(xold)-lgamma(alpha.0)-beta.0\*xold

newlnpost <- (alpha.0)\*log(beta.0)+(alpha.0-1.0)\*log(xnew)-lgamma(alpha.0)-beta.0\*xnew

if (log(runif(1))<(newlnpost-oldlnpost+E)) {

x[i] <- xnew

} else {

x[i] <- xold

}

}

hist(x[1000:5000],br=seq(-1,29,0.1),probability=T,xlim=c(0,9))

lines(seq(0,9,0.01),dgamma(seq(0,9,0.01),alpha.0,beta.0))

###########################################################################################

####### Real Data #########################################################################

#S&P 100 INDEX,RTH (^OEX)

dataR <- read.csv("D:/program/garchMHnov/data/S&P100\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_SAP100.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#FTSE 100 (^FTSE)

dataR <- read.csv("D:/program/garchMHnov/data/FTSE100\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_FTSE100.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#IBEX 35 (^IBEX)

dataR <- read.csv("D:/program/garchMHnov/data/IBEX35\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_IBEX35.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#NIKKEI 225 (^N225)

dataR <- read.csv("D:/program/garchMHnov/data/NIKKEI225\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_NIKKEI225.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#HANG SENG INDEX (^HSI)

dataR <- read.csv("D:/program/garchMHnov/data/HSI\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_HSI.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#DAX (^GDAXI)

dataR <- read.csv("D:/program/garchMHnov/data/DAX\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_DAX.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#PSEI (^PSI)

dataR <- read.csv("D:/program/garchMHnov/data/PSEI\_from\_Jan1998\_to\_Oct2002.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_PSEI.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#NASDAQ-100 (DRM) (^NDX)

dataR <- read.csv("D:/program/garchMHnov/data/NASDAQ100\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_NASDAQ100.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#S&P 500 INDEX,RTH (^GSPC)

dataR <- read.csv("D:/program/garchMHnov/data/S&P500\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_SAP500.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

#AEX (^AEX)

dataR <- read.csv("D:/program/garchMHnov/data/AEX\_from\_Jan1996\_to\_Oct2000.csv")

len.R <- length(dataR[,7])

dataRrv <- dataR[len.R:1,7]

Return.R <- 100\*(log(dataRrv[-len.R])-log(dataRrv[-1]))

#write.table(Return.R,"D:/program/garchMHnov/data/RData\_AEX.txt",col.names=FALSE,row.names=FALSE)

dataR[1,1]

dataR[len.R,1]

len.R

dev.off()

windows(width=12,height=8)

par(mfrow=c(3,1))

par(mar=c(0,0,0,0))

plot(Return.R,type="l")

plot(Return.R\*Return.R,type="h")

hist(Return.R,br=seq(-50,50,.5),xlim=c(-10,10),probability=T)

length(Return.R)

###########################################################################################

####### Test #########################################################################

plot(x[-1]/x[-10000])

--- Cycle 499 --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1 202 0.9409 -0.0358 | 0.5295 0.2936 0.5552

2 364 -0.0332 0.6964 | 0.0144 0.7050 0.2463

3 434 -0.4392 -0.3994 | 0.0608 0.5545 0.4445

--- Cycle 1119 --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1 196 0.7086 -0.2617 | 0.8421 0.5245 0.4646

2 497 -0.1281 0.3921 | 0.0170 0.6253 0.3556

3 307 -0.3892 -0.4234 | 0.0561 0.2955 0.4345

double phi2\_init[] = { 0.5, 0.0, 0.0}; // AR order + 1

double phi3\_init[] = { 0.0, 0.5, 0.0}; // AR order + 1

double phi4\_init[] = { -0.5, -0.5, 0.0}; // AR order + 1

double alp2\_init[] = { 1.0, 0.8, 0.1}; // alpha order + 1

double alp3\_init[] = { 0.01, 0.5, 0.5}; // alpha order + 1

double alp4\_init[] = { 0.10, 0.1, 0.8}; // alpha order + 1

###########################################################################################

####### Anlysis ###########################################################################

data0 <- read.table("D:/program/garchMHnov/data/dataFS\_00full.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/output/dataFS\_2\_00\_XXXave\_para.txt.gz"))

windows(width=12,height=8)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,data0[range0,5],col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(0,80),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,1],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,sqrt(data0[range0,5]),col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(0,5),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,2],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

layout(matrix(c(1,2,3,4,5),5,1,byrow=TRUE),heights=c(3,3,3,3,1),TRUE)

par(mar=c(1,1,0.1,0.1))

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,data0[range0,4],col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(-1,1),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,3],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

plot(1:1000,data0[1:1000,5],type="h",col=4,ylim=c(0,20))

lines(1:1000,avepX[1:1000,1],type="l",col=2,lwd=1.5)

###########################################################################################

####### Anlysis ###########################################################################

calll <- function(avep) {

Loglikelihood <- (-1) \* avep[1,]

for (i in 2:10000) {

diff0 <- Loglikelihood - (-1) \* avep[i,]

if (diff0>0) { Loglikelihood <- (-1) \* avep[i,] + log(1+exp(-diff0)) }

else { Loglikelihood <- Loglikelihood + log(1+exp(diff0)) }

}

return (-Loglikelihood+log(10000))

}

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_XXXlikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_onelikelihood.txt.gz"))

calll(avepX)

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_onelikelihood.txt.gz"))

calll(avepX)

windows(width=25,height=10)

draw0 <- function(data0,avep0,avepX) {

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0.1,0.1))

plot(Nlist,data0[Nlist,1]^2,type="h",col="grey",ylim=c(0,70),xlim=c(0,1225),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

lines(Nlist,avepO[Nlist,1],type="l",col=4,lwd=1.5,lty=12)

lines(Nlist,avepX[Nlist,1],type="l",col=2,lwd=1.5,lty=1)

axis(1,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0,padj=-2,cex.axis=.7)

axis(4,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

}

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP100.txt")

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_0609\_SAP500\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_SAP100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_SAP100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_FTSE100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_FTSE100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_IBEX35.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_IBEX35",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_NIKKEI225.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_NIKKEI225",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_HSI.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_HSI",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_DAX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_DAX",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_PSEI.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_PSEI",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_NASDAQ100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_NASDAQ100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP500.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_SAP500",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_AEX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_AEX",type="pdf")

windows(width=25,height=10)

drawnp0 <- function(data0,avep0,avepX) {

par(mar=c(1,1,0.1,0.1))

plot(avepX[,1],type="l",col=4,lwd=1.5,lty=1,ylim=c(0,15),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n")

axis(1,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0,padj=-2,cex.axis=.7)

axis(4,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

}

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_SAP100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_FTSE100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_FTSE100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_IBEX35.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_IBEX35",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_NIKKEI225.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_NIKKEI225",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_HSI.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_HSI",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_DAX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_DAX",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_PSEI.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_PSEI",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_NASDAQ100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_NASDAQ100",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP500.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_SAP500",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_AEX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_XXXnp.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_onenp.txt.gz"))

drawnp0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/np\_AEX",type="pdf")

windows(width=25,height=10)

drawsigma0 <- function(avepX) {

layout(matrix(c(1,2,3,0),4,1,byrow=TRUE),heights=c(5,5,5,1),TRUE)

par(mar=c(0,1,0.1,0.1))

plot(avepX[,300],type="l",col=4,ylim=c(0,20),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

axis(1,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0.01,padj=-2,cex.axis=.7,col.axis=0)

axis(2,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0,padj=-2,cex.axis=.7,col.axis=0)

axis(4,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0,padj=1.7,cex.axis=.6,col.axis=0)

text(500,18,expression(sigma[300]^2))

par(mar=c(0,1,0.1,0.1))

plot(avepX[,600],type="l",col=4,ylim=c(0,20),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

axis(1,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0.01,padj=-2,cex.axis=.7,col.axis=0)

axis(2,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0,padj=-2,cex.axis=.7,col.axis=0)

axis(4,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0,padj=1.7,cex.axis=.6,col.axis=0)

text(500,18,expression(sigma[600]^2))

par(mar=c(0,1,0.1,0.1))

plot(avepX[,900],type="l",col=4,ylim=c(0,20),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

axis(1,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,9000,1000)),labels=c(seq(0,9000,1000)),tck=0,padj=-2,cex.axis=.7,col.axis=0)

axis(4,at=c(seq(0,20,2)),labels=c(seq(0,20,2)),tck=0,padj=1.7,cex.axis=.6,col.axis=0)

text(500,18,expression(sigma[900]^2))

}

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_SAP100",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_FTSE100\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_FTSE100",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_IBEX35\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_IBEX35",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NIKKEI225\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_NIKKEI225",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_HSI\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_HSI",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_DAX",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_PSEI\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_PSEI",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_NASDAQ100\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_NASDAQ100",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP500\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_SAP500",type="pdf")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_AEX\_00\_XXXproc\_h2.txt.gz"))

drawsigma0(avepX)

savePlot("D:/recentfiles/GARCH/sigma\_AEX",type="pdf")

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP100.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_XXXproc\_h2.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_SAP100\_00\_oneproc\_h2.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/GARCH/h2\_SAP100",type="pdf")

data0 <- read.table("../data/RData\_SAP100.txt")

avepX <- read.table(gzfile("./RData\_SAP100\_00\_XXXgarch.txt.gz"))

avepO <- read.table(gzfile("./RData\_SAP100\_00\_onegarch.txt.gz"))

draw0(data0,avep0,avepX)

plot(avepX[,1200],type="l")

windows(width=25,height=10)

draw0 <- function(data0,avep0,avepX) {

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0,0))

plot(Nlist,data0[Nlist,1],type="l",col="grey",ylim=c(-5,5),xlim=c(0,1225),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(Nlist,avepO[Nlist,2],type="l",col=4,lwd=1.5,lty=12)

lines(Nlist,avepX[Nlist,2],type="l",col=2,lwd=1.5,lty=1)

axis(1,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.01,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

}

for (i in 0:3) {

range0 <- i \* 250 + 1:250

plot(range0,data0[range0,5],col=3,type="l",lty=2,xlim=c(min(range0),max(range0)),ylim=c(0,80),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5)

lines(range0,avepX[range0,1],col=4,type="l",lty=1,lwd=1.5)

axis(1,at=c(seq(0,480,20),seq(520,980,20)),labels=c(seq(0,480,20),seq(520,980,20)),tck=0.05,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,20)),labels=c(seq(-100,100,20)),tck=0.05,padj=1.7,cex.axis=.6)

}

par(mar=c(0,0,0,0))

plot(0,0,type="n",ylim=c(0,1),xlim=c(0,1),bty="n",xaxt="n",yaxt="n")

legend(0,1.2,c("Bayesian Mixture AR(1)-GARCH(1,1) ","Bayesian AR(1)-GARCH(1,1)","True"),lty=c(1,4,2),col=c(4,2,3),cex=1.2,bty="n",ncol=3,lwd=1.5)

data0 <- read.table("D:/program/garchMHnov/data/RData\_NIKKEI225.txt")

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_NIKKEI225\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_NIKKEI225\_00\_oneave\_para.txt.gz"))

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0,0))

plot(Nlist,data0[Nlist,1]^2,type="h",col="grey",ylim=c(0,70))

lines(Nlist,avepO[Nlist,1],type="l",col=4,lwd=1.5)

lines(Nlist,avepX[Nlist,1],type="l",col=2,lwd=1.5)

Nlist <- 1:dim(data0)[1]

Nlist <- 200:900

par(mar=c(0,0,0,0))

plot(Nlist,data0[Nlist,1],type="l",col="grey",ylim=c(-10,10))

lines(Nlist,avepO[Nlist,2],type="l",col=4,lwd=1.5)

lines(Nlist,avepX[Nlist,2],type="l",col=2,lwd=1.5)

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_DAX\_00\_XXXnp.txt.gz"))

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_HSI\_00\_XXXnp.txt.gz"))

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_NIKKEI225\_00\_XXXnp.txt.gz"))

barplot(table(avepX[,1])[1:20])

plot(1:10000,avepX[,1],type="s",ylim=c(1,20))

data0 <- read.table("D:/program/garchMHnov/data/RData\_DAX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_oneave\_para.txt.gz"))

data0 <- read.table("D:/program/garchMHnov/data/RData\_DAX.txt")

avepX <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_XXXproc\_h2.txt.gz"))

avepO <- read.table(gzfile("I:/garchMHnovoutput/RData\_DAX\_00\_oneproc\_h2.txt.gz"))

data0 <- read.table("D:/program/garchMHnov/data/RData\_HSI.txt")

avepX <- read.table(gzfile("D:/program/garchMHnov/output/RData\_HSI\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("D:/program/garchMHnov/output/RData\_HSI\_00\_oneave\_para.txt.gz"))

windows(width=25,height=10)

draw0 <- function(data0,avep0,avepX) {

Nlist <- 1:dim(data0)[1]

par(mar=c(1,1,0.1,0.1))

plot(Nlist,data0[Nlist,1]^2,type="h",col="grey",ylim=c(0,20),xlim=c(0,1225),xaxt="n",ylab="",xlab="",xaxs="i",yaxs="i",yaxt="n",lwd=1.5,bty="o")

lines(Nlist,avepO[Nlist,1],type="l",col=4,lwd=1.5,lty=12)

lines(Nlist,avepX[Nlist,1],type="l",col=2,lwd=1.5,lty=1)

axis(1,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0.01,padj=-2,cex.axis=.7)

axis(2,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0.01,padj=1.7,cex.axis=.6)

axis(3,at=c(seq(0,2800,200)),labels=c(seq(0,2800,200)),tck=0,padj=-2,cex.axis=.7)

axis(4,at=c(seq(-100,100,5)),labels=c(seq(-100,100,5)),tck=0,padj=1.7,cex.axis=.6)

#legend(30,65,c("Bayesian Mixture GARCH(1,1) ","Bayesian GARCH(1,1)"),lty=c(1,2),col=c(2,4),cex=1,lwd=1.5)

}

data0 <- read.table("D:/program/garchMHnov/data/RData\_SAP500.txt")

avepX <- read.table(gzfile("I:/Simulation Output/garchMHnovoutput/RData\_SAP500\_00\_XXXave\_para.txt.gz"))

avepO <- read.table(gzfile("I:/Simulation Output/garchMHnovoutput/RData\_SAP500\_00\_oneave\_para.txt.gz"))

draw0(data0,avep0,avepX)

savePlot("D:/recentfiles/IEEEconference/h2\_SAP500",type="pdf")