Appendix A
SUMMARY OF R CODES USED

Code for Time Series

Listing 1: Summary of R codes used.

```
rain=scan("baguiorainfall.dat")
rain
raintimeseries=ts(rain, frequency=12, start=c(2001,1))
raintimeseries
plot.ts(raintimeseries)
rainforecasts<- HoltWinters(raintimeseries)
rainforecasts
rainforecasts$SSE
plot(rainforecasts)
library(forecast)
rainforecasts2=forecast.HoltWinters(rainforecasts,h=12)
rainforecasts2
plot.forecast(rainforecasts2)
acf(rainforecasts2$residuals, lag.max=20)
Box.test(rainforecasts2$residuals, lag=20, type="Ljung-Box")
plot.ts(rainforecasts2$residuals)
plotForecastErrors=function(forecasterrors)
{
# make a red histogram of the forecast errors:
mybinsize=IQR(forecasterrors)/4
mymin=min(forecasterrors)*3
mymax=max(forecasterrors)*3
mybins=seq(mymin, mymax, mybinsize)
hist(forecasterrors, col="red", freq=FALSE, breaks=mybins)
# freq=FALSE ensures the area under the histogram = 1
mysd=sd(forecasterrors)
# generate normally distributed data with mean 0 and standard deviation mysd
mynorm=rnorm(10000, mean=0, sd=mysd)
myhist=hist(mynorm, plot=FALSE, breaks=mybins)
# plot the normal curve as a blue line on top of the histogram of forecast errors:
points(myhist$mids, myhist$density, type="l", col="blue", lwd=2)
}
plotForecastErrors(rainforecasts2$residuals)
```