MATH 5075 R Project 7

Your Name Here

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Remember: I expect to see commentary either in the text, in the code with comments created using **#**, *or (preferably) both!* ***Failing to do so may result in lost points!***

Since this assignment involves simulation, I set the seed to the following in order to get the same results:

```
set.seed(5292016)
```

Problem 1

Use the function ***fracdiff.sim()*** *in the package* ***fracdiff*** *to simulate 200 observations of an* $ARIMA(1, .4, 1)$ *process, where the AR coefficient is* $\phi = 0.5$ *and the MA coefficient is* $\theta = 0.5$. *Plot the process and its ACF.*

```
# Your code here
```

Problem 2

Consider the data set ***nyse*** *(****astsa****), which contains returns of the New York Stock Exchange.*

1. *Plot the absolute deviations of the data set and their ACF. Why is this data set likely to be a long memory process?*

```
# Your code here
```

2. *Use* ***fracdiff()*** *from the* ***fracdiff*** *package to estimate the fractional differencing parameter* d *for this data set. Report the value of* d.

```
# Your code here
```

3. *Use the* ***diffseries()*** *function from* ***fracdiff*** *to obtain the residuals for this data set after fractionally differencing. Plot the residuals and their ACF. Comment.*

```
# Your code here
```

Problem 3

Long-memory processes bear a strong resemblance to other forms of nonstationarity, such as structural change in a process. To see this, simulate a process x_t *where* $x_t \sim N(0, 1)$ *for* $1 \leq t \leq 100$ *and* $x_t \sim N(5, 1)$ *for* $101 \leq t \leq 200$. *This represents a single change in the mean of the process. Find the process's ACF, compute the fractional differencing parameter* d, *obtain the residuals for the data set after fractionally differencing it, plot the residuals, and find their ACF. Did fractional differencing solve the problem? Comment.*

```
# Your code here
```