AMTH250 Assignment 3

Due: 22nd August

1. Create the following LaTeX source file following the instructions referred to in the comments.

```
\documentclass[11pt,a4paper]{article}

\usepackage{amsmath}
\usepackage{graphicx}
\usepackage{epstopdf}     % to include eps graphics

\title{AMTH250 \\ Assignment 3}
\author{}                 % Your name goes here

\begin{document}

\maketitle

Here is a random $4 \times 4$ matrix:
\begin{verbatim}
                          % Output from Step 2 goes here
\end{verbatim}
and here is a graph of Brownian motion:

                      % See Step 3 for creating the graph
\begin{figure}[!ht]
  \begin{center}
    \includegraphics[width=0.8\textwidth]{brown.eps}
    \caption{Brownian Motion}
  \end{center}
\end{figure}

\end{document}
```

Read the instructions on setting up Octave before starting Octave.

2. In Octave do:

   ```
   octave:> a = randn(4,4)
   ```

   and copy and paste the resulting matrix into your LaTeX file between the `\begin{verbatim}` and `\end{verbatim}` commands.

3. Again in Octave do:

   ```
   octave:> x = randn(1, 1000);
   octave:> xx = cumsum(x);
   octave:> plot(xx)
   octave:> print brown.eps
   ```

4. Check your graphics is in correct folder (see below) and run the source file through LaTeX.

5. Submit the resulting `.pdf` file together with your `.tex` source file.

Doing Assignment 3

It is assumed that you have already installed Octave.

The body of your assignment should look like:

Here is a random 4×4 matrix:

```
-1.12176  -0.65457   1.18312   0.15561
-1.16553  -0.93077  -0.14187   1.20561
-0.24583   1.74784   0.98754  -0.62462
 0.70669   1.82959   0.35398  -0.35203
```

and here is a graph of Brownian motion:

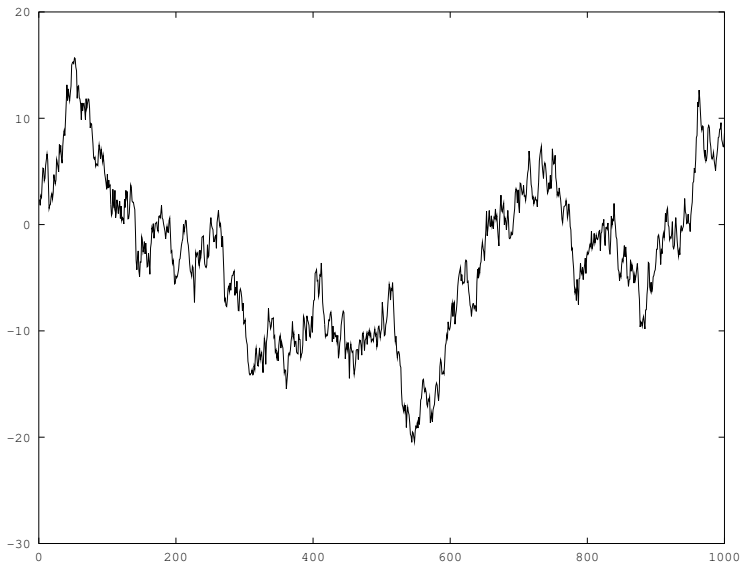

Figure 1: Brownian Motion

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1 Setting Up Octave

You need to control where Octave saves graphics files and looks for m-files.

Windows

The easiest approach is to create a folder to hold your octave files, say
`C:/Documents and Settings/amth250/octave`
To point Octave to this folder:

1. Right click on the Octave icon and select Properties.
2. Select Shortcut
3. In the Start In box type in the path of your octave folder, e.g.
   `C:/Documents and Settings/amth250/octave`

The Octave command `pwd` will tell you the folder to which Octave will put graphics files.

Linux

When you start Octave from the command line, Octave will look for m-files and write graphics files to the directory in which you start Octave. So `cd` to appropriate directory before starting Octave.

2 Copy and Paste

Windows

Copying from Octave and pasting into Texworks is done as follows:

1. Click on the Octave icon at the upper left corner of the Octave window.
2. Select Edit → Mark.
3. Mark the area to be copied with the mouse and press Enter to copy.
4. In Texworks select Edit → Paste.

Linux

The usual copy and paste works:

1. Mark the area to be copied using the left mouse button.
2. Move the cursor to where you wish to paste the text and click on the mouse wheel.

3 File Names

Do not allow spaces, e.g. `assign3 fig1.pdf`, in the names of any files used by Octave.

4 Graphics Files

The `print` command in Octave is liable to produce warning messages, especially the first time it used in an Octave session. You can safely ignore these.

LaTeX and Octave Graphs

Octave can produce graphs in a number of formats. For inclusion in a LaTeX document via pdflatex the `pdf` format should be most appropriate. However the pdf graphs produced by Octave seem to be designed to sit on a page by themselves, so when they are included in LaTeX there is too much space above and below the graph. The easiest way around this is produce graphs in `eps` (encapsulated postscript) format, as in the assignment. These have the right amount of space around them and, in my opinion, look better than the `pdf` graphs.