MATH 286

INSTRUCTIONS FOR ACCESSING ITOVSN3 AND STOSOLVE SOFTWARE

DOWNLOADING ITOVSN3: SYMBOLIC STOCHASTIC CALCULUS FOR CONTINUOUS SEMIMARTINGALES (developed by Wilfrid Kendall)

From your home directory (where you login to the server), make a directory called ito:

mkdir ito

Go into that directory:

cd ito

Copy the compressed ito software from the public folder:

cp ../../public/ito/ito.uue ito.uue

Uncompress etc. the ito.uue file (the following three commands should be executed in sequence, that is, you need to execute one before typing the next one):

uudecode ito.uue

gunzip ito.tar

tar -xvf ito.tar

You should then see a stream of items printed on your screen indicating what is being unpackaged from the .tar file. When this is finished, there should now be three things in your current directory: ito.uue ito.tar Itovsn3 (The latter is a directory Itovsn3. You can check this just by typing: ls which will give a listing of the items in your current directory).

Move to the Itovsn3 directory:

cd Itovsn3

(this directory contains some introductory information and subdirectories: you should read intro.txt, index.txt, readme.txt).

Now move to the subdirectory Mma3 where the Mathematica notebooks that you will use are stored:

cd Mma3

(It is very important that there is a copy of Itovsn3.m in whatever directory your notebooks are stored in and invoked from. You can check this is true now by typing ls and checking that Itovsn3.m is one of the things that appears in the list of files in the directory. Do not make changes to Itovsn3.m as it contains the macro definitions under which the ito software works).

WINDOWS NT: The above instructions are for download to a UNIX system. The Itovsn3 software will run on both a UNIX and a Windows system (and possibly on any other system with Mathematica installed). If you wish to, after downloading to your UNIX account, you can copy the whole Itovsn3 directory to a Windows PC using an ftp program.

DOWNLOADING STOSOLVE SOFTWARE FOR SIMULATING SOLUTIONS OF STOCHASTIC DIFFERENTIAL EQUATIONS (developed by T. Lyons, Jessica Gaines, D. Glickenstein and R. Williams)

There are different versions of this software for UNIX and Windows NT platforms. The reason for this is that this software uses C programs and those are different on different platforms.

UNIX VERSION – these instructions are for downloading the UNIX Version of the software.

From your home directory (where you login to the server), make a directory called ustosolve:

mkdir ustosolve

Go into that directory:

cd ustosolve

Copy the stosolve software from the public folder ustosolve to your directory.

cp ../../public/ustosolve/ustosolve.tar.gz ustosolve.tar.gz

Uncompress etc. the ustosolve.tar.gz file (the following two commands should be executed in sequence, that is, you need to execute one before typing the next one):

gunzip ustosolve.tar.gz

tar -xvf ustosolve.tar

There should now be two things in your current directory: ustosolve.tar Stosolve (The latter is a directory Stosolve. You can check this just by typing: ls which will give a listing of the items in your current directory).

WINDOWS NT VERSION – FOR USE ON YOUR OWN NT MACHINE

From your home directory (where you login to the server), make a directory called stosolve:

mkdir stosolve

Go into that directory:

cd stosolve

Copy the stosolve software from the public folder stosolve to your directory.

cp ../../public/stosolve/stosolve.tar.gz stosolve.tar.gz

Uncompress etc. the stosolve.tar.gz file (the following two commands should be executed in sequence, that is, you need to execute one before typing the next one):

gunzip stosolve.tar.gz

tar -xvf stosolve.tar

There should now be two things in your current directory: stosolve.tar Stosolve (The latter is a directory Stosolve. You can check this just by typing: ls which will give a listing of the items in your current directory).

At this point, you have downloaded the Windows NT version of the software to your UNIX account. To use it, you will want to ftp or copy the directory Stosolve to your Windows NT PC. With an appropriate ftp program (usually under the network folder), you can copy the whole directory.

WINDOWS NT VERSION – FOR USE WITH THE MACHINES IN THE INTEL LAB

From your home directory (where you login to the server), make a directory called stosolvenew:

mkdir stosolvenew

Go into that directory:

cd stosolvenew

Copy the stosolve software from the public folder stosolvenew to your directory.

cp ../../public/stosolvenew/stosolvenew.tar.gz stosolvenew.tar.gz

Uncompress etc. the stosolvenew.tar.gz file (the following two commands should be executed in sequence, that is, you need to execute one before typing the next one):

gunzip stosolvenew.tar.gz

tar -xvf stosolvenew.tar

There should now be two things in your current directory: stosolvenew.tar Stosolve (The latter is a directory Stosolve. You can check this just by typing: ls which will give a listing of the items in your current directory).

At this point, you have downloaded the Windows NT version of the software to your UNIX account. From the INTEL lab you will be able to access that account (as drive H) from your INTEL PC (provided you have logged into your insci14 account from that machine).

USING ITOVSN3 NOTEBOOKS - ON A UNIX SYSTEM

You are now ready to start using the Itovsn3 notebooks.

Start Mathematica by typing mathematica (do not abbreviate as math or you will not get the notebook version of mathematica)

There are several mathematica notebooks in the Mma3 directory. These all end in .nb to indicate that they are notebooks.

I suggest you start by first looking at the non-executable notebook Reference.nb which will help you understand the macro definitions that come with Itovsn3. You can open this by moving the mouse to the file menu, clicking on it, then clicking on open, then clicking on Intro.nb and loading that notebook into mathematica.

Opening modules within a notebook: Note that the downward arrows at the side of the notebook are markers for text that has been "folded up" or hidden from view. To reveal the text, double click on the downward arrow. To fold it up again, double click on the double arrow again. You don't have to study this notebook in detail at this point, but you may wish to refer to it, or its printed version, at times when working through the other notebooks which do not give elaborate descriptions of the macros.

Now start with Intro.nb. This is an executable notebook. Load it in just as you did Reference.nb (go to the file menu, open etc.). Work through this notebook from top to bottom. You will need to unfold hidden text before you can execute any of it (recall that to unfold you double click on the downward arrow). To execute a command (or block of commands), click once (to highlight) on the right square bracket (perhaps with a little triangle at the top of it) that is to the right of the command and then press "Shift" and "Enter" together. (The latter is the command needed to execute commands in Mathematica notebooks.) Make sure that when you execute the first command: Needs["Itovsn3‘"], the output from Mathematica is sensible – if you get a message containing "Cannot open Itovsn3", you do not have Itovsn3.m in a directory where Mathematica can see it.

After working through Intro.nb you may want to look next at Bessel.nb.

If you make changes to a notebook, you should save it with a different name than Wilfrid Kendall's version (so as to not corrupt the original versions). The new name should still end in .nb.

USING STOSOLVE NOTEBOOKS - ON A UNIX SYSTEM

Similar instructions apply to using the Stosolve notebooks as for Itovsn3. The notebooks are in the directories noise and flow.

Start mathematica by typing mathematica (do not abbreviate as math or you will not get the notebook version of mathematica)

Within the directory Stosolve, there are two notebooks, one called stosolve.nb in the subdirectory flow and stosolve2.nb in the subdirectory noise. These notebooks approximate solutions to stochastic differential equations using a C program and allow you to represent the results or compute with the results using mathematica. The notebook stosolve.nb fixes the noise source and allows one to see the effect of varying the initial condition. The second notebook, stosolve2.nb allows one to see the effect of varying the noise with the initial condition fixed.

The notebooks are basically self explanatory – they contain examples already set up, but they can be edited to suit any example you wish to work with.

Loading a notebook: You can load a notebook by going to the file menu in mathematica, clicking on open and selecting the notebook you want to open (it will always have an extension of .nb).

Opening up modules in a notebook: note that the downward arrows at the side of the notebook are markers for text that has been "folded up" or hidden from view. To reveal the text, double click on the downward arrow. To fold it up again, double click on the double arrow again.

Work through the notebook from top to bottom. This is important since some packages need to be loaded before you can execute commands further down. The first time through, don't make any changes, just run the notebook as is (although you will want to make sure to save the parameters files so that a new compile of the C program is done). You should unfold hidden text before you can execute any of it (recall that to unfold you double click on the downward arrow). To execute a command (or block of commands) in the mathematica notebook, click once (to highlight) on the right square bracket (perhaps with a little triangle at the top of it) that is to the right of the command and then press "Shift" and "Enter" together. (The latter is the command needed to execute commands in mathematica notebooks.) Make sure that when you execute the commands, the output from mathematica is sensible.

If you make changes to a notebook, you should save it with a different name than the downloaded version (so as to not corrupt the original version). The new name should still end in .nb.

USING ITOVSN3 or STOSOLVE WITH WINDOWS NT

To use the mathematica notebooks on a Windows NT machine you will need to make sure that mathematica is installed. For Stosolve you will also need Visual C++.

Once you have downloaded the Itovsn3 or Stosolve directory, you can go into those folders and you will see in a subdirectory (Mma.3 for Itovsn3 or flow or noise for Stosolve) mathematica notebooks – they have extensions of .nb and may have the mathematica symbol inside the notebook icon. For Stosolve these are the stosolve.nb and stosolve2.nb notebooks.

YOUR OWN NT MACHINE:

For your own windows NT machine it is best to fire up the notebook by double clicking on it since this will set the paths correctly. However, to open subsequent notebooks you should close down mathematica and then double click on the next new notebook, due to a bug in Mathematica on NT machines – if you don't close Mathematica, but double click on a new notebook, only the first notebook will come up. Mathematica is aware of this bug but does not know how to fix it at this time!

Once you have opened a notebook, you just work through it in a similar manner to that described for the UNIX versions. The main difference is that for Stosolve, you will be using Visual C++ and so a window will need to be opened to edit the parameters file – instructions are in the notebook.

THE NT MACHINES IN THE INTEL LAB

For these machines, you can access the Mathematica notebooks through the H drive. These will probably not have little mathematica icons in them, since the system does not recognize such notebooks (for a reason we currently do not understand). However, the notebooks will all have an extension of .nb. For stosolve the appropriate notebooks are stosolvenew.nb in the flow directory and stosolve2new.nb in the noise directory. You can fire a notebook up starting mathematica (from the START menu) and opening a notebook from the file menu (the double clicking procedure will not work). Once you have done this, you just work through the noteobook in a similar manner to that described for the UNIX versions. The main difference is that for Stosolve, you will be using Visual C++ and so a window will need to be opened to edit the parameters file – instructions are in the notebook.