Friction Model Simulator

Thanks to Professor Jim Stimson of the University of North Carolina for writing this program. Please note that the program was written on a volunteer basis and has not been "bomb-proofed." That means that it does not have error messages and checking processes to ensure that various user errors are corrected before it runs. Rather, it will simply abort and give a standard Microsoft error message if there are any errors. We have made every effort to write these instructions as carefully and completely as possible. If it does not work on your computer please try again a few times changing various parameters before giving up! It does work. We have tried to indicate problems that users have encountered but we may not have located them all. If you have further information about problems or questions, contact Frank Baumgartner at Frankb@psu.edu. Please do not bother Jim Stimson!

The program files are located in a zipped file named "Friction_Model_Simulation.zip".

1. Download this entire directory into a folder with the name of your choice or directly to your computer's desktop (this file is temporary only; you will be able to delete once the installation is complete).

2. Unzip the files. (Double-click on "Friction_Model_Simulation.zip" and choose "extract all files.") This will create a directory called \Friction_Model_Simulation. (This is also temporary, so accepting the default should be fine.)

3. Close all programs that may be open on your computer, run "setup.exe" and follow the instructions. It will automatically create a directory called c:\program files\jbsim and within that directory create an application program called jbsim.exe. You can change the location where the program is installed if you prefer; just follow the options. However the default should be fine.

4. Create a directory on your computer called "C:\data\". This is where the program will direct its output files. Each time you run the program it will output an ascii file whose name you can specify. This output file will contain: 1) a line summarizing the input parameters you chose; 2) a line summarizing the output parameters (kurtosis of the signal and the response); and 3) a complete frequency distribution for all values from -5.00 to +5.00 with increments of 0.01. These data can be used in any spreadsheet or graphics program to produce a frequency distribution showing the shape of your results.

5. The program should be ready to run. Just double-click on jbsim.exe and specify the values you prefer. Click run and the results will appear on screen in a few seconds. The output file will also be created. Go to the file manager to see this file. Note that the program expects inputs in American syntax: use periods, not commas, for decimal places, and commas (or nothing) but not periods for thousand-separators. The program will close immediately if it gets input it does not expect. If this occurs simply reopen and try again.

6. You may delete the zipped files and the Friction_Model_Simulation directory; these files have no further use.

7. After using the program, users may find it easier to move the files from C:\data to another location. However, the program is designed to output files to this location only. Once you have completed running the program you can move the files wherever you like and delete the directory. Running the program again requires creating the C:\data directory again. If you already have a directory with that name we recommend that you rename that directory, at least temporarily while you are using this program.

The Friction Model Simulator allows users to specify three parameters simulating various threshold effects, levels of friction, and an "amplification" parameter which affects how the system responds to signals once they pass the threshold. The model takes as input a normal random distribution of 1,000,000 numbers and generates outputs based on the user-specified parameters. The final output consists of a frequency distribution of the data resulting form the model as well as a calculation of kurtosis for the distribution. It takes just a few seconds to run, so users can easily run many different versions of the model with different parameters to understand better the workings of the model.

Note that each run of the model will generate an ascii file with summary data about the input parameters chosen and the kurtosis of the output, as well as a frequency distribution. Users can specify the name of the file. If you run multiple versions of the model, remember to save the outputs with different file names; otherwise each will be over-written by the next one. These files can then be copied into Excel or another program in order to generate histograms or plots to see the shapes of the distributions generated by each of the different parameterizations that you generate.

Instructions for reading the data into Excel:

1. run the jbsim.exe program, creating a file called "c:\data\jbsim1.prn"
2. (You may open the jbsim1.prn file with Microsoft Notepad or any ascii editor in order to view it. This is not necessary.)
3. Open Excel
    a. Click you mouse in cell A1. This will ensure that the data you import go there.
    b. Go to: >Data > Import External Data >Import Data
    c. Browse to locate the prn file you just created: c:\data\jbsim1.prn and click Open
    d. If it is not clicked already click on Fixed Width (this should be the default)
    e. Where it asks: Start Import at row: specify "4"
    f. You should see the data align correctly in the dialogue box below
    g. Click Next, Next, and Finish
    h. You should have three columns of data
        i. Categories of the x variable, ranging from -5.00 to +5.00 in increments of 0.01. (These are sometimes called "bins.")
        ii. The input series, consisting of counts of how many cases were in each bin. This is defined to be Normal but is recreated for each run of the simulation. With 1,000,000 cases you will see that it is extremely consistent!
        iii. The output series, which shows the distribution of cases by bin. Depending on the parameters you specified, this may be more or less punctuated.
        iv. (Note that the first and last bins include cases beyond the extreme value; all other bins include only those cases with values between the value indicated and the next lower value.)

i. To graph the data, simply
    i. highlight the 3 columns by clicking on the column labels at the top of the screen: A, B, and C
    ii. click on the graph icon
    iii. choose XY (scatter plot) and the icon of your choice to determine whether the graph has points, lines, or both
    iv. follow the options to produce the graph with labels and a title

4. If you want to merge multiple simulations into a single spreadsheet, note that the process will be identical each time and the only column of data that will change will be the output series. So you can easily cut and paste various output series in adjacent columns in order to produce graphs with several distributions on the same graph.

See:

Bryan D. Jones and Frank R. Baumgartner, *The Politics of Attention: How Government Prioritizes Problems* (Chicago: University of Chicago Press, 2005), Chapter 6, and
Bryan D. Jones and Frank R. Baumgartner, A Model of Choice for Public Policy. *Journal of Public Administration Research and Theory* 15, 3 (July 2005): 325–51.