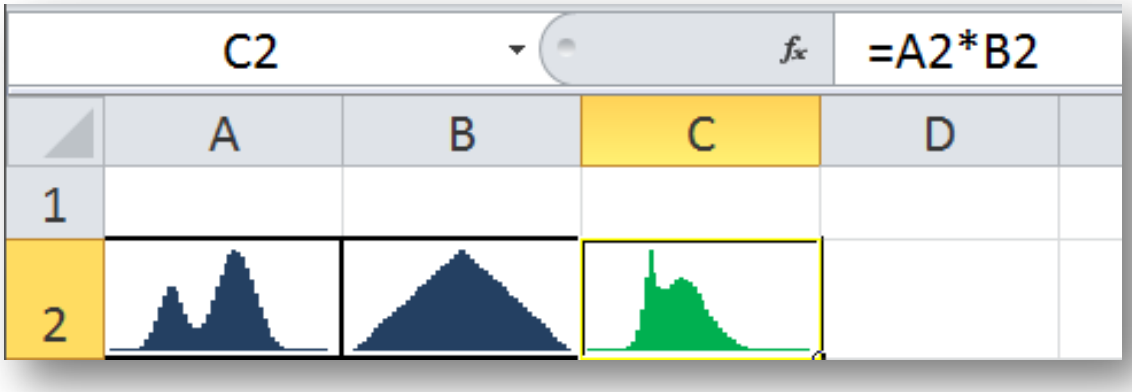
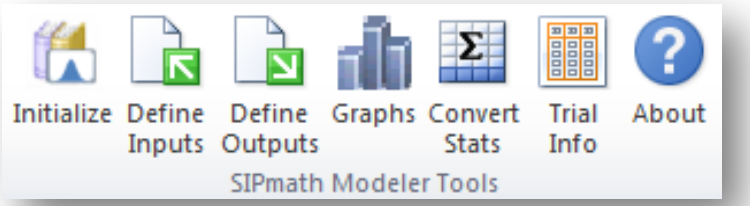
SIPmath™ Modeler Tools Getting Started Guide*



Sam Savage (Sam@ProbabilityManagement.org)

Marc Thibault (Marc@ProbabilityManagement.org)



Rev. Apr. 9, 2015

SIPmath™ Modeler Tools Version 2.4

* For more details please consult the SIPmath Modeler Tools Reference

The SIPmath Modeler Tools operate in two primary modes:

Random Mode

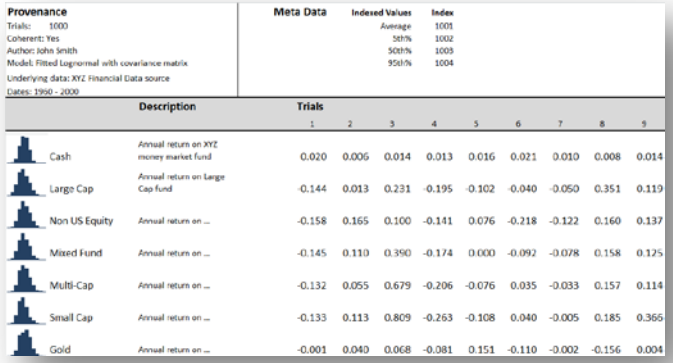
In this mode, random inputs are generated with built-in Excel generators. This can quickly create interactive Monte Carlo simulations in Excel, in which thousands of trials are run before the user's finger leaves the <Enter> key. Since inputs are produced dynamically by Excel, the resulting output distributions will vary from run to run.

SIP Library Mode

Stochastic library mode utilizes pre-compiled Monte Carlo trials (SIPs) to represent the uncertainty in the model inputs. This guarantees repeatability of results across multiple users and trials and allows results to be aggregated across applications. A SIP Library may be either built into the model workbook or linked to as an external file, for example in the cloud, so that many users share a common set of trials.

Both modes produce models that run in native Excel and do not require the Tools. Thus they may be easily distributed and shared across a very wide audience.

Stochastic Library Example



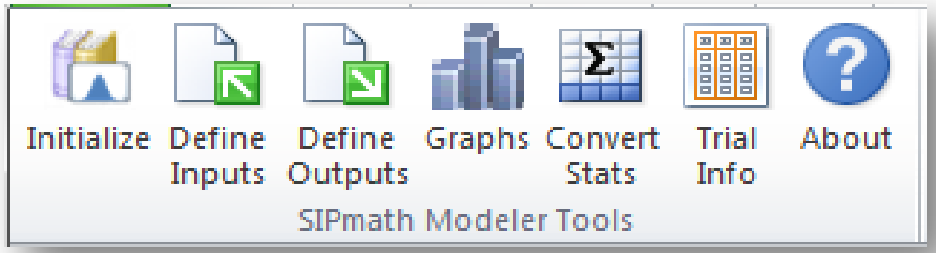
Provenance		Meta Data	Indexed Values	Index
Trials: 1000			Average	1001
Coherent: Yes			5th%	1002
Author: John Smith			50th%	1003
Model: Fitted Lognormal with covariance matrix			95th%	1004
Underlying data: XYZ Financial Data source				
Dates: 1990 - 2000				

	Description	Trials								
		1	2	3	4	5	6	7	8	9
Cash	Annual return on XYZ money market fund	0.020	0.006	0.014	0.013	0.016	0.021	0.010	0.008	0.014
Large Cap	Annual return on Large Cap fund	-0.144	0.013	0.231	-0.195	-0.102	-0.040	-0.050	0.351	0.119
Non US Equity	Annual return on ...	-0.158	0.165	0.100	-0.141	0.076	-0.218	-0.122	0.160	0.137
Mixed Fund	Annual return on ...	-0.145	0.110	0.390	-0.174	0.000	-0.092	-0.078	0.158	0.125
Multi-Cap	Annual return on ...	-0.132	0.055	0.679	-0.206	-0.076	0.035	-0.033	0.157	0.114
Small Cap	Annual return on ...	-0.133	0.113	0.809	-0.263	-0.108	0.040	-0.005	0.185	0.366
Gold	Annual return on ...	-0.001	0.040	0.068	-0.081	0.151	-0.110	-0.002	-0.156	0.004

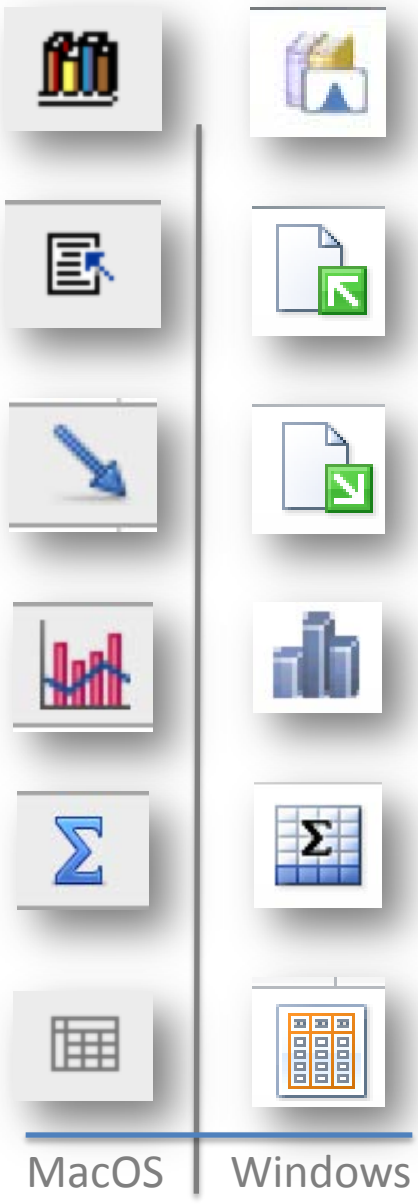
Main Ribbon

MacOS

Windows



Main Ribbon



The *Initialize* tool is where the modeler identifies the Stochastic Library containing the Input SIPs for use in SIP Library mode and specifies the number of trials to run if creating a model to run in Random mode.

The *Define Inputs* tool is where the modeler identifies the model's input cells and links them to the desired input SIPs. This tool is not required in Random Mode.

The *Define Outputs* tool is where the modeler identifies the model's output cells and links them to the data table to create the Output SIPs, which are created in either mode.

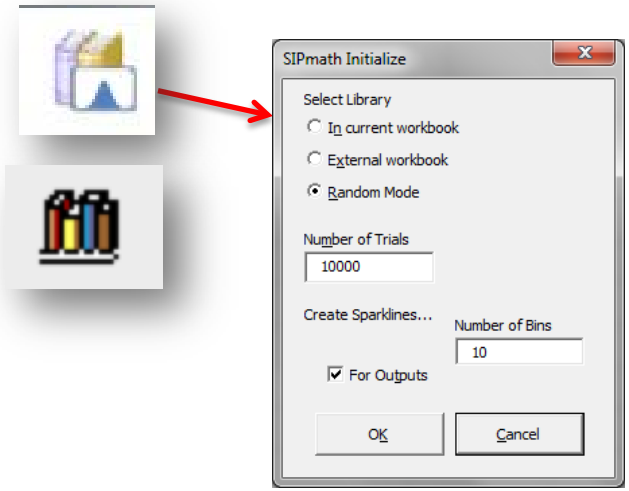
The *Graphs* tool provides an easy way to create histograms and cumulative distributions from the output SIPs in either mode. It may also be used to graph pre-existing data arrays.

The *Stats* tool facilitates the use of Excel's native statistical formulas with the output SIPs. It is useful for formulas such as AVERAGE(), STDEV(), PERCENTILE() etc. Click button on a blank cell for instructions.

The *Trial Info* tool provides a simple way to step through the input SIPs one trial at a time or view optional meta data in SIP Library mode only.

Random Mode Quick Start

1. Initialize SIPmath in the random mode



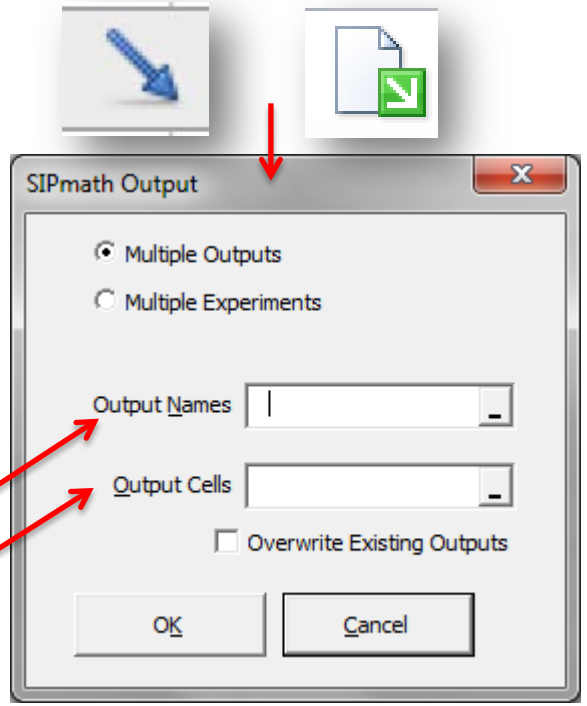
2. Build a model based the Excel random generators or Random Generators.xlsx:

	A	B
1		
2		"uniform sum"
3		=SUM(A5+B5)
4		
5	=RAND()	=RAND()

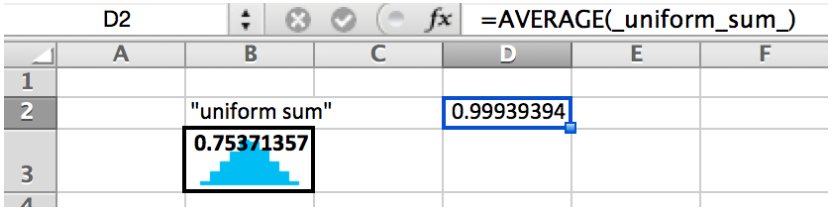
generators

model formula

3. Describe model outputs

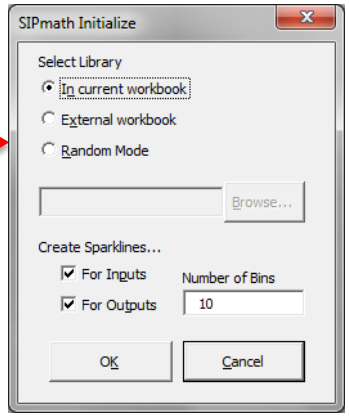


4. Graph and explore the output SIP

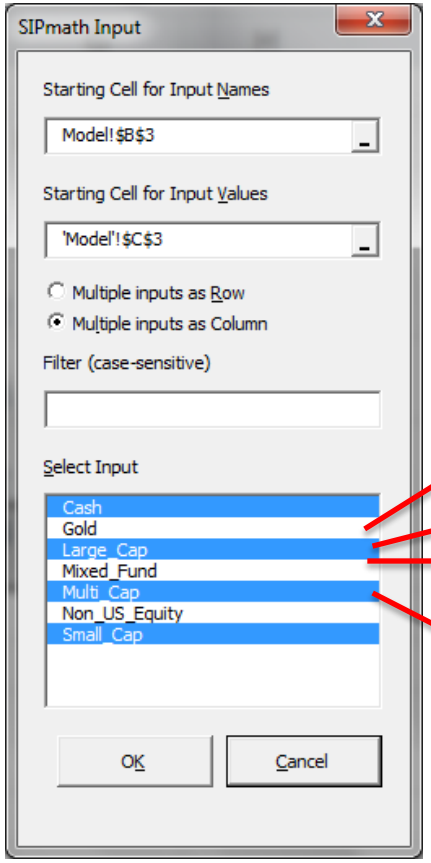


SIP Library Mode Quick Start

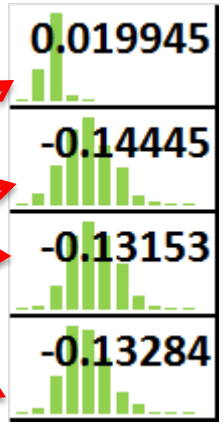
1. Initialize in the Library mode (current or external workbook)

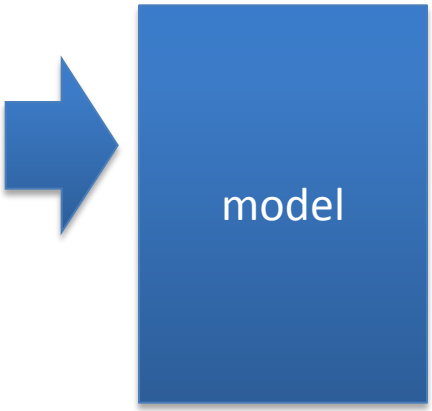


2. Designate input cells

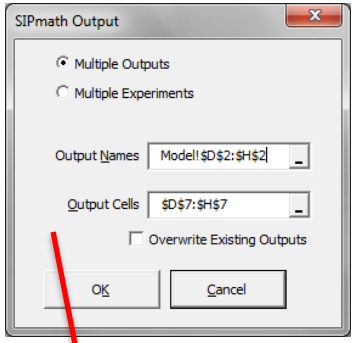


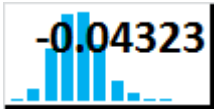
3. Build a model using uncertain inputs





4. Specify outputs





SIP Library Sheet Example

Libraries are free-format, with information conveyed in Excel variable names & range names.
Other Formats include XML and CSV.

Number of realizations is stored in a cell named: PM_Trials. NOTE Do NOT count the Meta Data, just the Trials

Library Provenance is stored in a cell named: PM_Lib_provenance

Optional Indexed Meta Data Values may be appended to the ends of the SIPs. The labels and index positions must be stored in arrays with special names. In this case, for example, the "Average" is stored one position beyond the last trial in the SIP

Provenance

Trials: 1000
Coherent: Yes
Author: John Smith
Model: Fitted Lognormal with covariance matrix
Underlying data: XYZ Financial Data source
Dates: 1960 - 2000

Meta Data

Indexed Values	Index
Average	1001
5th%	1002
50th%	1003
95th%	1004

Range name: PM_Meta

Range name: PM_Meta_INDEX

	Description	Trials								
		1	2	3	4	5	6	7	8	9
Cash	Annual return on XYZ money market fund	0.020	0.006	0.014	0.013	0.016	0.021	0.010	0.008	0.014
Large Cap	Annual return on Large Cap fund	-0.144	0.013	0.231	-0.195	-0.102	-0.040	-0.050	0.351	0.119
Non US Equity	Annual return on ...					0.076	-0.218	-0.122	0.160	0.137

SIPs may be stored as Rows or Columns, but must be named for example : "Large Cap"

Stay in Touch

Questions?

Come visit ProbabilityManagement.org for the newer software distributions and examples

Check SIPmath Modeler Tools Reference Manual for more information

The SIPmath Modeler Tools Reference contains tutorials and a more detailed description

Check SIPMaker companion tools

Generate SIPs for the SIPmath Modeler Tools from XLSim, Crystal Ball and @RISK.
See our Tools page for details.

Submit suggestions & bug reports

Send an e-mail to Dave@probabilitymanagement.org with OS version, Excel version, SIPmath Modeler version and exact sequence of events that need an improvement

Contribute for code & standards development

ProbabilityManagement.org is a non-profit organization depending on sponsor contributions and volunteer work. If interested, please contact us at Melissa@probabilitymanagement.org