

# Statistics Library

Definition of Statistical Variations of Parameters and Variables

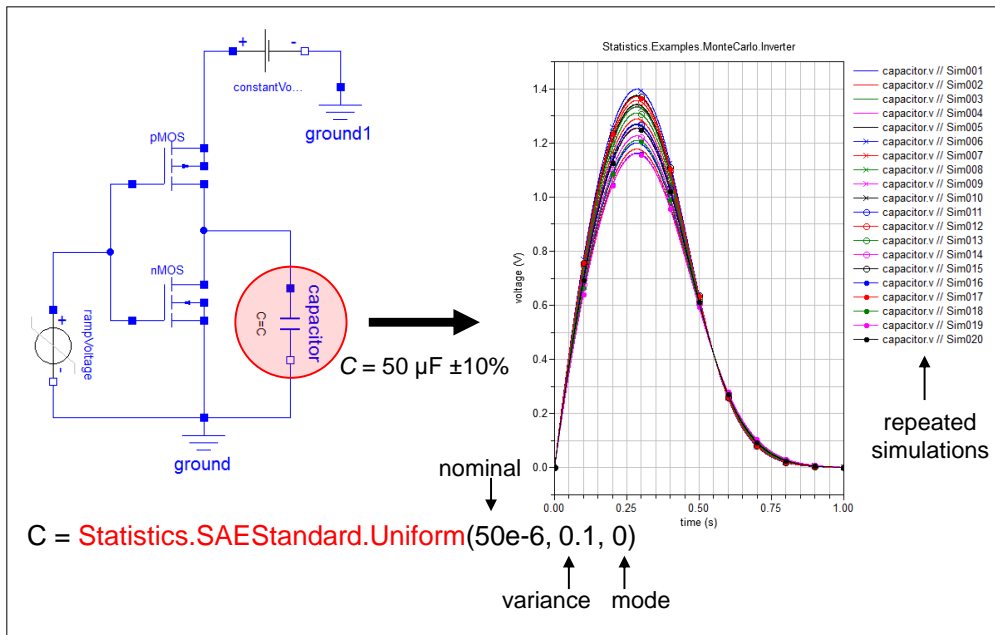
Statistics

Modelica  
Library

developed by Fraunhofer IIS EAS  
distributed by BAUSCH-GALL GmbH

The Statistics Library is designed to handle statistical analysis tasks using Modelica functions by variation of parameters and variables. In order to analyze the performance and robustness of system models, there are two main applications of the library:

1. Monte Carlo analysis, where the model parameters are calculated by statistical distribution functions. Repeated simulation varies the parameters according to the chosen distribution.



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- Examples
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  - UniformM
  - Uniform
  - Normal
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  - Normal01
  - StdNormal
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  - StdDiscretePdf
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2. Noise Generation: The sampled call of a statistical distribution function generates noise during transient simulation.

The Statistics Library was developed in the Fraunhofer research project CAROD. It includes a set of statistical functions based on standard SAE J2748 and supports:

- Usage of the same model for nominal and Monte Carlo analysis
- Possibility to assign different statistical distributions to one parameter
- Continuous and discrete distributions which may be user-defined
- Possibility to specify correlation between parameters and variables
- Independent random number generation for each parameter and variable
- Reproducibility of a Monte-Carlo simulation

## Development

Fraunhofer Institute for Integrated Circuits IIS, Design Automation Division EAS, Dresden, Germany ([www.eas.iis.fraunhofer.de](http://www.eas.iis.fraunhofer.de))

## Availability

Statistics Library 1.3 is available for Dymola

Tested on Dymola 2014 and Modelica Standard Library 3.2

Please ask for availability for SimulationX and OpenModelica.

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