A new Implementation of the N-D Lookup Tables

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The HDF5Table library is an open-source solution for the efficient handling, exchange and interpolating access of typical data sets in system simulation. The library consists of C-functions, python scripts and examples and can be used with different applications like Modelica or Simulink. Furthermore a comprehensive set of tools that allows the user to create, migrate, edit, compare and manage the datasets is available. The application range covers data import from measurements or other simulations, integration of datasets in preprocessing routines, the usage of the datasets in the simulation and the post processing of simulation results. To eliminate a major source of errors after data exchange between simulation tools or different companies and to validate the datasets each dataset can have a physical unit and quantity attached to it. The table data can be easily accessed with different methods for inter- and extrapolation. To persist and exchange the data sets a subset of the HDF5 [1] standard is used. With the HDF5 API the data access is fast for large files with many variables containing millions of values and the datasets can be opened in many other tools.

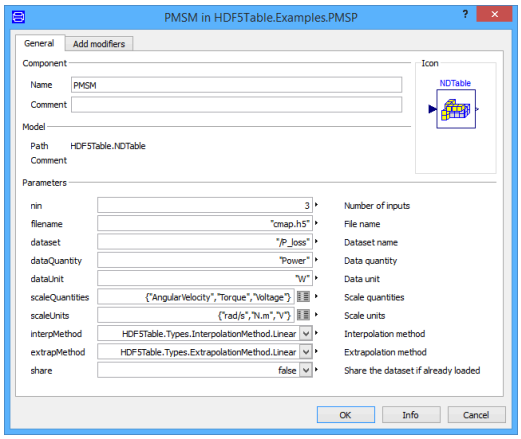

Figure 1 NDTable block parameters

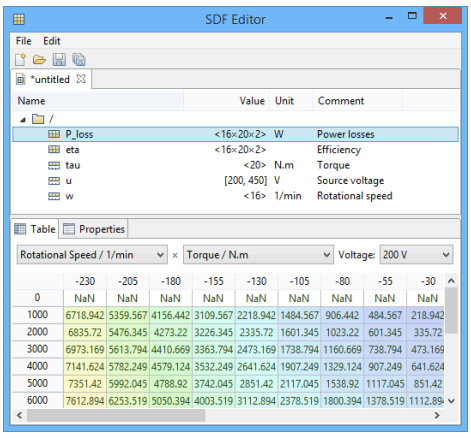

Figure 2 HDF5 dataset editor

A number of solutions exist for Modelica [2] and other simulation platforms that suffer from different limitations and problems the proposed implementation together with a set of supporting tools is trying to solve. The above figures show the parameters dialog of the Modelica block and the corresponding HDF5 data file that contains the three-dimensional table with scales, units and quantities.

References

[1] HDF5 Software Documentation, http://www.hdfgroup.org/HDF5/doc/index.html

[2] Call for Quotation of an Open Source Implementation of the MSL Table Interpolation Blocks, https://www.modelica.org/news_items/call-texts-to-improve-modelica-2012/2012-12-20-Call-for-quotation-for-MSL-tables.pdf/at_download/file