

Technical Details — OpenModelica User's Guide v1.21.0-dev-211-gcd8969a225 documentation

This chapter gives an overview of some implementation details that might be interesting when building tools around OpenModelica.

The MATv4 Result File Format

The default result-file format of OpenModelica is based on MATLAB level 4 MAT-files as described in the [MATLAB documentation](#). This format can be read by tools such as MATLAB, [Octave](#), [Scilab](#), and [SciPy](#). OpenModelica will write the result-files in a particular way that can be read by tools such as [DyMat](#) and [Dymola](#) (OpenModelica can also read files generated by Dymola since the used format is the same).

The variables stored in the MAT-file are (in the order required by OpenModelica):

Aclass

- Aclass(1,:) is always Atrajectory
- Aclass(2,:) is 1.1 in OpenModelica
- Aclass(3,:) is empty
- Aclass(4,:) is either binTrans OR binNormal

The most important part of the variable is Aclass(4,:) since there are two main ways the result-file is stored: transposed or not. For efficiency, the result-file is written time-step by time-step during simulation. But the best way to read the data for a single variable is if the variables are stored variable by variable. If Aclass(4,:) is binTrans, all matrices need to be transposed since the file was not transposed for efficient reading of the file. Note that this affects all matrices, even matrices that do not change during simulation (such as name and description).

name

Is an $n \times m$ character (int8) matrix, where n is the number of variables stored in the result-file (including time). m is the length of the longest variable. OpenModelica stores the trailing part of the name as NIL bytes (0) whereas other tools use spaces for the trailing part.

description

Is an $n \times m$ character (int8) matrix containing the comment-string corresponding to the variable in the name matrix.

dataInfo

Is an $n \times 4$ integer matrix containing information for each variable (in the same order as the name and description matrices).

- dataInfo(i,1) is 1 or 2, saying if variable i is stored in the data_1 or data_2 matrix. If it is 0, it is the abscissa (time variable).
- dataInfo(i,2) contains the index in the data_1 or data_2 matrix. The index is 1-based and may contain several variables pointing to the same row (alias variables). A negative value means that the variable is a negated alias variable.
- dataInfo(i,3) is 0 to signify linear interpolation. In other tools the value is the number of times differentiable this variable is, which may improve plotting.
- dataInfo(i,4) is -1 in OpenModelica to signify that the value is not defined outside the time range. 0 keeps the first/last value when going outside the time range and 1 performs linear interpolation on the first/last two points.

data_1

If it is an $n \times 1$ matrix it contains the values of parameters. If it is an $n \times 2$ matrix, the first and second column signify start and stop-values.

data_2

Each row contains the values of a variable at the sampled times. The corresponding time stamps are stored in data_2(1,:). data_2(2,1) is the value of some variable at time data_2(1,1).