Tips on OpenModelica Scripting

Zhang Zheng

2019/06/29

Contents

- How to scripting
- Parameter unchangable issue
- Convergen improvment
- Restart simulation
- A useful tool "DyMat"

How to scripting

- You can run script (*.mos file) in:
    - OMC (recomannded)
    - OMShell
    - OMPython
    - etc.

- Example:
    >omc [compile options] YOUSCRIPT.mos

    * ref. OpenModelicaUsersGuide-latest.pdf

How to scripting

YOUSCRIPT.mos

```
loadModel(Modelica)
getErrorString();
loadFile("BouncingBall.mo");
getErrorString();
buildModel(BouncingBall);
getErrorString();
for i in 1:3 loop
    value := 0.7 + i;
    system("./BouncingBall -override=e="+String(value)+" -r=BouncingBall"
    + String(i) + "_res.mat");
    getErrorString();
end for;
```

-override=value or -override value Override the variables or the simulation settings in the XML setup file For
    example: var1=start1,var2=start2,par3=start3,startTime=val1,stopTime=val2

Parameter unchangable issue

- XXX_init.xml file
  - Automatica generated after compiling

```
<ScalarVariable
  name = "CO2_R10_A.adsorptionModel.qNl"
  valueReference = "3288"
  description = "[Nl], Normal Volume of adsorpted in all segments"
  variability = "continuous" isDiscrete = "false"
  causality = "internal" isValueChangeable = "false"
  alias = "noAlias"
  classIndex = "1256" classType = "rAlg"
  isProtected = "false" hideResult = "false"
  fileName = "C:/Users/zhangzheng/Downloads/Adsorptors_20190227_byEps
  <Real fixed="false" useNominal="false" />
</ScalarVariable>
```

Case013.exe	2019/06/19 22:35	アプリケーション
Case013_06inz_part0.c	2019/06/19 22:34	C ファイル
Case013_06inz_part0.o	2019/06/19 22:34	O ファイル
Case013_06inz_part1.c	2019/06/19 22:34	C ファイル
Case013_06inz_part1.o	2019/06/19 22:34	O ファイル
Case013_06inz_part2.c	2019/06/19 22:34	C ファイル
Case013_06inz_part2.o	2019/06/19 22:34	O ファイル
Case013_06inz_part3.c	2019/06/19 22:34	C ファイル
Case013_06inz_part3.o	2019/06/19 22:34	O ファイル
Case013_08bnd_part0.c	2019/06/19 22:34	C ファイル
Case013_08bnd_part0.o	2019/06/19 22:34	O ファイル
Case013_08bnd_part1.c	2019/06/19 22:34	C ファイル
Case013_08bnd_part1.o	2019/06/19 22:34	O ファイル
Case013_08bnd_part2.c	2019/06/19 22:34	C ファイル
Case013_08bnd_part2.o	2019/06/19 22:34	O ファイル
Case013_info.json	2019/06/19 22:34	JSON ファイル
Case013_init.xml	2019/06/19 22:34	XML ドキュメント

- isValueChangable = "false"
  - Manually change it, isValueChangable = "true"   -> Sometimes not work
  - >omc **-d=newInst** YOUSCRIPT.mos   -> Is there a trap?

Convergen improvment

Default Solver: "dassl"

 try to use "ida", "jacobian".

Example: use following simulation flags

```
system(" ./BouncingBall  -s=ida -override=e="+String(value)+" -
r=BouncingBall" + String(i) + "_res.mat");
```

```
system(" ./BouncingBall  -jacobian=numerical -override=e="+String(value)+" -
r=BouncingBall" + String(i) + "_res.mat");
```

Restart simulation

- Use following simulation flags

  system(" ./BouncingBall -iif=restartfile.mat -override=e="+String(value)+" -r=BouncingBall" + String(i) + "_res.mat");

-iif=value or **-iif value** Value specifies an external file for the initialization of the model.

A useful tool "DyMat"

- A python package to read and process the result files (*.mat) from Dymola and OpenModelica.

- Links:
  - https://www.j-raedler.de/projects/dymat/
  - https://bitbucket.org/jraedler/dymat/src/master/
  - https://pypi.org/project/DyMat/

- Command line / Python API

- Example: (Command line)

8.2 Exporting variables

You need to specify a list of variables, either on the command line or read from a file. Variable names on the command line are comma-separated like this:

```
$ DyMatExport.py -e "foo.bar,baz,a.b.c" myfile.mat
```

This will export the variables *foo.bar*, *baz* and *a.b.c*. For more than just a couple of names you should consider using a file with names instead:

```
$ DyMatExport.py -x vars.txt myfile.mat
```

*ref. DyMat-Guide.pdf