Borefield model

1 Install

To run the model, you will need Dymola 2014 FD01 (64bit) or a later version. Make sure that you open the 64-bit by default. Also use version 3.2 or higher of the Modelica Standard Library.

2 Structure of the code

The code is divided in several packages:

1. Data: all the parameter values of the borefield are stored here. This package also includes parameters for the calculation of the step response (short and long-term) and for the aggregation technic. The records `SoilData, FillingData, GeometricData, StepResponse`, and `Advanced` contain the general parameter values. The record `ShortTermResponse` reads a mat-file which should contain the fluid temperature response for the general parameters given by the other records. Finally, the record `BorefieldData` groups the six records into one.
2. BaseClasses: most of the calculations for the borefield are done by its base classes. It includes the model for the short-term response, the model for the long-term response, functions for the aggregation technic and some scripts to automate the calculation of the short-term response for given parameters and the saving of the results in a .mat file (see section 4).
3. Examples: some examples to show how you can run the model

3 Initialization of a new borefield model

The borefield model is based on a temperature response model. Prior any simulation, the model will build a step-response and create the aggregation cells. This is only semi-automatic. Every time the user want to use a different borefield (different parameter values), he should build a new records structure as following:

1. Go on `borefield/Data` and create new record for `SoilData, FillingData, FillingData, GeometricData, StepResponse, Advanced` with appropriate values for their parameters. Notice that most of the parameters have default values.
2. Run the script `borefield/BaseClasses/Script/ShortTimeResponseHX` in order to create a new record *ShortTermResponse*:
   (a) right click on the function's name
   (b) fill inputs:

i. name: give the name of your new record model

ii. Tree Data: select the *soi, fill, geo, adv* and *steRes* that you have created (click on *arrow* > *select record* > *recordName*)

iii. click on execute

iv. Check from simulation tab that you get 3 times *True*.

v. If no errors occur, go *Data/ShortTermResponse* and duplicate *example* (right click > new > duplicate) and give the model a new name

vi. change the string *exampleData* to the new name and click on check the model

vii. if it gives an error, give the full path of your computer

3. Finally, make a new record *Data/BorefieldData* calling all the new subrecord you have made

4 Simulation

Simulating the model is now very easy. Go for example on `Borefield.Examples.MultipleBoreholesWithHe`
Change the parameter `lenSim` to the desired simulation time (necessary to know for the aggregation technique). Change also the type of the borefieldData to the newly creating record by modifying the parameter `Data.BorefieldData.example_accurate bfData` to your new record.