Instructions on utilizing METIS for generating *.reach files for parallel tRIBS simulations.

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A. Download and install METIS

Download METIS version 4.0 from:
http://glaros.dtc.umn.edu/gkhome/fetch/sw/metis/metis-4.0.tar.gz
Instructions for installing can be found in:
http://glaros.dtc.umn.edu/gkhome/metis/metis/download.

B. Decompress metis_scripts.zip

Decompress the file `metis_scripts.zip`. This will create a folder called `metis_scripts` containing the following files:

1. `connectivity2metis.pl`
2. `metis2tribs.pl`
3. `run_metis.ksh`

These files are based on perl and ksh shells and are needed to create the *.reach file needed to run tribs in parallel option.

C. Run meshbuilder

The only input required to use the metis scripts is `connectivity.meshb`. This file is created by meshbuilder starting from *.points file of the basin. Thus, it is necessary to separately create `connectivity.meshb` and copy it into the folder where `connectivity2metis.pl`, `metis2tribs.pl`, and `run_metis.ksh` are located.

D. Use run_mestis.ksh

The main script that generates the *.reach with different partitioning options is `run_tribs.ksh`. This file calls `connectivity2metis.pl` and `metis2tribs.pl` that <u>need</u> to stay in the same directory where `run_tribs.ksh` is located.
The usage is as follows:

```
$ ksh ./run_metis.ksh NumberOfNodes OPT_Part basename
```

where:
   `NumberOfNodes` are the number of nodes that we will use in the parallel simulation;

   `OPT_Part` is the option used to select the kind of partitioning. This value can be:

1 --> SurfaceFlow (SF)
       2 --> Surface-Subsurface Flow (SSF)
       3 --> Surface-Subsurface Flow with Headwaters (SSF-H).

   `basename` is the name of the basin for which we want to create the *.reach file.

An example of usage is:

```
$ ksh ./run_metis.ksh 4 1 Baron_Fork        (*)
```

E. Outputs produced by run_mestis.ksh

The use of `run_tribs.ksh` produces the *.reach file named as follows (depending on the kind of partitioning option):

SF case: *basename*_flow_*NumberOfNodes*nodes.reach

SSH case: *basename*_nconn_*NumberOfNodes*nodes.reach

SF case: *basename*_upnconn_*NumberOfNodes*nodes.reach

In addition to the *.reach file, a number of intermediate outputs files with extensions *.out, *.dat and *.dat.part. *NumberOfNodes* are also generated and can be eventually removed.

For example, the instruction (*) produces:

```
Baron_Fork_flow_4nodes.reach
```

and

```
flow_Baron_Fork_4nodes_stats.out
Baron_Fork_metis_flow.dat
flow_Baron_Forknodes_4_stats.out
Baron_Fork_metis_flow.dat.part.4
```