

The structure of network extraction code output files

This file is taken from the PhD Thesis of Taha Sochi (2007).

For further information, please visit:

<http://www3.imperial.ac.uk/earthscienceandengineering/research/perm/porescalemodelling>

Appendix I

The Structure of the Network Data Files

The network data are stored in four ASCII files. The format of these files is that of Statoil. The physical data are given in SI unit system.

Throat Data

The data for the throats are read from the link files. The structure of the link files is as follows:

1. *prefix_link1.dat* file

The first line of the file contains a single entry that is the total number of throats, say N , followed by N data lines. Each of these lines contains six data entries in the following order:

1. Throat index
2. Pore 1 index
3. Pore 2 index
4. Throat radius
5. Throat shape factor
6. Throat total length (pore center to pore center)

Example of *prefix_link1.dat* file

```
26146
1   -1    8   0.349563E-04   0.297308E-01   0.160000E-03
2   -1   53   0.171065E-04   0.442550E-01   0.211076E-04
3   -1   60   0.198366E-04   0.354972E-01   0.300000E-04
4   -1   68   0.938142E-05   0.323517E-01   0.100000E-04
```

2. *prefix_link2.dat* file

For a network with N throats, the file contains N data lines. Each line has eight data entries in the following order:

1. Throat index
2. Pore 1 index
3. Pore 2 index
4. Length of pore 1
5. Length of pore 2
6. Length of throat
7. Throat volume
8. Throat clay volume

Example of *prefix_link2.dat* file

```
22714 10452 10533 0.178262E-04 0.120716E-03 0.239385E-04 0.218282E-13 0.137097E-14
22715 10452 10612 0.121673E-04 0.747863E-04 0.100000E-04 0.266790E-13 0.355565E-14
22716 10453 10534 0.100000E-04 0.270040E-04 0.139862E-04 0.543278E-13 0.863932E-14
```

Pore Data

The data for the pores are read from the node files. The structure of the node files is as follows:

1. *prefix_node1.dat* file

The first line of the file contains four entries: the total number of pores, the length (x -direction), width (y -direction) and height (z -direction) of the network. For a network with M pores, the first line is followed by M data lines each containing the following data entries:

1. Pore index
2. Pore x -coordinate
3. Pore y -coordinate
4. Pore z -coordinate
5. Pore connection number
6. For a pore with a connection number i there are $2(i + 1)$ entries as follows:
 - A. The first i entries are the connecting pores indices
 - B. The $(i + 1)$ st entry is the pore “inlet” status (0 for false and 1 for true)

- C. The $(i + 2)$ nd entry is the pore “outlet” status (0 for false and 1 for true)
- D. The last i entries are the connecting throats indices

Note: the inlet/outlet pores are those pores which are connected to a throat whose other pore is the inlet/outlet reservoir, i.e. the other pore has an index of -1/0. So if the $(i + 1)$ st entry is 1, one of the connecting pores indices is -1, and if the $(i + 2)$ nd entry is 1, one of the connecting pores indices is 0.

Example of *prefix_node1.dat* file

```
12349  0.300000E-02  0.300000E-02  0.300000E-02
1  0.350000E-03  0.000000E+00  0.700000E-04  3  796  674  2  0  0  522  523  524
2  0.450000E-03  0.500000E-04  0.000000E+00  3  359  31  1  0  0  525  526  524
3  0.880000E-03  0.100000E-04  0.000000E+00  1  392  0  0  527
```

2. *prefix_node2.dat* file

For a network with M pores, the file contains M data lines. Each line has five data entries in the following order:

1. Pore index
2. Pore volume
3. Pore radius
4. Pore shape factor
5. Pore clay volume

Example of *prefix_node2.dat* file

```
50  0.373367E-13  0.195781E-04  0.336954E-01  0.784623E-16
51  0.155569E-14  0.821594E-05  0.326262E-01  0.471719E-16
52  0.171126E-13  0.122472E-04  0.329865E-01  0.148506E-15
```