BURBOUN input mini manual

A code for the simulation of the 2D steady-state fluid flow in porous blocks containing transmissive fractures

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As input for BURBOUN (Block-with-fractURes flow analysis by BOUNdary element/finite element methods) computer code, an input file with extension .DAT is required. It is structured as follows:

CARD 1 TitleR: title, max. 80 characters
CARD 2 nblocs,nelsid,nelemf: # of rectangular blocks to be analyzed, # of elements per block edge, # of elements per each fracture branch (3 integers)

per each block of the nblocs blocks:
CARD 3 Xbl,Ybl,Xtr,Ytr,conduc,nfract(jblocs),ninter(jblocs): x-coordinate of the bottom left corner, y-coordinate of the bottom left corner, x-coordinate of the top right corner, y-coordinate of the top right corner, K hydraulic conductivity of the rock matrix, # of fracture branches, # of inner intersections among fracture branches (excepted the intersections with the block edges) (5 real numbers and 2 integers)

per each fracture branch ifract of the nfract(jblocs) fracture branches in jblocs block:
CARD 4 xfrext(ifract,1),yfrext(ifract,1),xfrext(ifract,2),yfrext(ifract,2), transm(ifract): x-coordinate of the first extremity of the fracture branch, y-coordinate of the first extremity of the fracture branch, x-coordinate of the second extremity of the fracture branch, y-coordinate of the second extremity of the fracture branch, T transmissivity of the fracture branch (5 real numbers)

per each inner intersection iinter of the ninter(jblocs) intersections in jblocs block:

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CARD 5 (LabelsIF(iinter,i),IntExt(iinter,i),i=1,4): per each i branch of the intersecting branches in intersection iinter the label of the branch and 1 (if the extremity is the first one) or 2 (if the extremity is the second one); if there are only three branches the last couple is 0, 0 (8 integers)

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BURBOUN application example, manuscript subm. to Comp. Geosci. January 2024
1,4,4                                   !CARD2
0.,0.,10.,10.,1.0E-08,21,10             !CARD3
0.00  6.91  2.35 4.90  3.034E-07        !CARD4
0.00  3.72  2.35 4.90  3.824E-06
0.00  1.38  5.00 2.64  1.099E-05
2.35  4.90  2.65 4.64  1.314E-07
2.35  4.90  5.74 6.60  3.214E-06
2.65  4.64  5.00 2.64  2.653E-07
2.65  4.64  5.26 5.23  5.103E-06
5.00  2.64  6.59 1.28  3.016E-07
5.00  2.64  6.04 2.90  1.275E-05
6.59  1.28  8.09 0.00  3.067E-07
5.26  5.23  6.04 2.90  5.143E-07
5.26  5.23  6.62 5.54  4.582E-06
6.04  2.90  6.59 1.28  6.376E-07
6.04  2.90  8.29 3.47  1.028E-05
2.98 10.00  5.74 6.60  1.798E-07
5.74  6.60  6.62 5.54  1.934E-07
6.62  5.54  6.88 5.21  5.684E-08
6.62  5.54 10.00 6.30  4.524E-06
6.88  5.21  8.29 3.47  1.973E-07
6.88  5.21 10.00 5.11  2.076E-06
8.29  3.47 10.00 1.38  2.158E-07
 1  2  2  2  4  1  5  1              !CARD5
 4  2  6  1  7  1  0  0
 6  2  3  2  8  1  9  1
 8  2 10  1 13  2  0  0
 7  2 11  1 12  1  0  0
11  2  9  2 13  1 14  1
15  2  5  2 16  1  0  0
16  2 12  2 17  1 18  1
17  2 20  1 19  1  0  0
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14   2 19   2 21   1   0   0
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The output file has extension .RES and contains the general data, the nodal values of the corresponding quantities (normal fluxes and hydraulic heads), and the global fluxes at the edges.