File structure

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n D COMP
ndof^1 nf^1 nfb^1 $|K|^1$ β^1 θ^1
$u^{1,1}$
$u^{1,2}$
$\vdots$
u^{1,ndof^1}
$u_x^{1,1}$
$u_y^{1,1}$
$u_x^{1,2}$
$u_y^{1,2}$
$\vdots$
u_x^{1,ndof^1}
u_y^{1,ndof^1}
nip_1^1
$[[u]]^{1,1,1}$
$[[u]]^{1,1,2}$
$\vdots$
$[[u]]^{1,1,\text{nip}_1^1}$
$[[u_x]]^{1,1,1}$
$[[u_y]]^{1,1,1}$
$[[u_x]]^{1,1,2}$
$[[u_y]]^{1,1,2}$
$\vdots$
$[[u_x]]^{1,1,\text{nip}_1^1}$
$[[u_y]]^{1,1,\text{nip}_1^1}$
nip_2^1
$[[u]]^{1,2,1}$
$[[u]]^{1,2,2}$
$\vdots$
$[[u]]^{1,2,\text{nip}_2^1}$
$\vdots$
$\text{nip}_{\text{nfb}^1}^1$
$[[u]]^{1,\text{nfb}^1,1}$
$[[u]]^{1,\text{nfb}^1,2}$
$\vdots$
$[[u]]^{1,\text{nfb}^1,\text{nip}_{\text{nfb}^1}^1}$
$[[u_x]]^{1,\text{nfb}^1,1}$
$[[u_y]]^{1,\text{nfb}^1,1}$
$[[u_x]]^{1,\text{nfb}^1,2}$
$[[u_y]]^{1,\text{nfb}^1,2}$
$\vdots$
$[[u_x]]^{1,\text{nfb}^1,\text{nip}_{\text{nfb}^1}^1}$
$[[u_y]]^{1,\text{nfb}^1,\text{nip}_{\text{nfb}^1}^1}$
$\text{err}^{1,1}$
$\text{err}^{1,2}$
$\vdots$
$\text{err}^{1,\text{ndof}^1}$
$\vdots$
ndof^n nf^n nfb^n $|K|^n$ β^n θ^n
$u^{n,1}$
$u^{n,2}$
$\vdots$
u^{n,ndof^n}
$u_x^{n,1}$
$u_y^{n,1}$
$u_x^{n,2}$
$u_y^{n,2}$
$\vdots$
u_x^{n,ndof^n}
u_y^{n,ndof^n}
nip_1^n
$[[u]]^{n,1,1}$
$[[u]]^{n,1,2}$
$\vdots$
$[[u]]^{n,1,\text{nip}_1^n}$
$[[u_x]]^{n,1,1}$
$[[u_y]]^{n,1,1}$
$[[u_x]]^{n,1,2}$
$[[u_y]]^{n,1,2}$
$\vdots$
$[[u_x]]^{n,1,\text{nip}_1^n}$
$[[u_y]]^{n,1,\text{nip}_1^n}$
nip_2^n
$[[u]]^{n,2,1}$
$[[u]]^{n,2,2}$
$\vdots$
$[[u]]^{n,2,\text{nip}_2^n}$
$\vdots$
$\text{nip}_{\text{nfb}^n}^n$
$[[u]]^{n,\text{nfb}^n,1}$
$[[u]]^{n,\text{nfb}^n,2}$
$\vdots$
$[[u]]^{n,\text{nfb}^1,\text{nip}_{\text{nfb}^n}^n}$
$[[u_x]]^{n,\text{nfb}^n,1}$
$[[u_y]]^{n,\text{nfb}^n,1}$
$[[u_x]]^{n,\text{nfb}^n,2}$
$[[u_y]]^{n,\text{nfb}^n,2}$
$\vdots$
$[[u_x]]^{n,\text{nfb}^n,\text{nip}_{\text{nfb}^1}^n}$
$[[u_y]]^{n,\text{nfb}^n,\text{nip}_{\text{nfb}^1}^n}$
$\text{err}^{n,1}$
$\text{err}^{n,2}$
$\vdots$
$\text{err}^{n,\text{ndof}^n}$

Figure 1: Data Structure of file for input and output data

Nomenclature:

- n - No of elements in the mesh
- D - Dimenson of the problem (currently on 2D)
- COMP - No of components (currently only scalar problem)
- ndof^i - No of dofs in the ith element
- nf^i - No of faces for the ith element (currently only triangles so nf$^i = 3$)
- nfb^i - No of **non-boundary** faces (nfb$^i = 1$ or 2 or 3)
- $|K|^i$ - Volume of the ith element
- β^i - Aspect ratio of the ith element
- θ^i - Orientation of the ith element
- $u^{i,j}$ - The jth coeffiecient of the solution on the ith element
- $u_x^{i,j}$ - The jth coeffiecient of the x gradient of the solution on the ith element
- $u_y^{i,j}$ - The jth coeffiecient of the y gradient of the solution on the ith element
- nip_j^i - No of integration points on the jth face of element i
- $[[u]]^{i,j,k}$ - Value of the jump in solution on the kth integration point of the jth face of the ith mesh element
- $[[u_x]]^{i,j,k}$ - Value of the jump in x gradient of the solution on the kth integration point of the jth face of the ith mesh element
- $[[u_y]]^{i,j,k}$ - Value of the jump in y gradient of the solution on the kth integration point of the jth face of the ith mesh element
- $\text{err}^{i,j}$ - The jth coeffiecient of the error on the ith element