

# FEP Assignment 4

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## **1 Introduction**

introduction text here.

## **2 Code Design**

design text here.

## **3 Testing**

teting text here.

## **4 Conclusion**

conclusion text here.

# A Code

## A.1 a4.cc

```
1 #include "eigen_headers/Sparse"
2
3 // PUMI Headers
4 #include <PCU.h>
5 #include <pumi.h>
6
7 // APF Headers
8 #include <apfNumbering.h>
9 #include <apfShape.h>
10
11 // GMI Headers
12 #include "gmi_mesh.h"
13 #include "gmi_sim.h"
14
15 //STL Headers
16 #include <iostream>
17 #include <fstream>
18 #include <set>
19 #include <vector>
20 #include <deque>
21 #include <iterator>
22 #include <string>
23 #include <sstream>
24 #include <cstdlib>
25 #include <math.h>
26
27
28 using std::cout;
29 using std::endl;
30 using std::string;
31
32
33 class classification_t
34 {
35     private:
36         std::vector<gmi_ent*> ents;
37         std::vector<double> mags;
```

```

38     public:
39         void push_back(gmi_ent* ent, double mag);
40         void get(int i, gmi_ent* ent, double mag);
41         void clear();
42         int size();
43         gmi_ent* get_min_mag( );
44     };
45
46     class boundaryCond_t
47     {
48     public:
49         char type; // N for Neumann, D for Dirichlet
50         int geom_dim;
51         int geom_ID;
52         int direction;
53         double value;
54         bool DOG_zero;
55         bool DOG;
56         void print();
57         boundaryCond_t();
58     };
59     class paramList
60     {
61     public:
62         int dimension;
63         int order;
64         int numSides;
65         int numXVerts;
66         int numYVerts;
67         double refinement;
68         pGeom geom;
69         gmi_model* gmi_geom;
70         pMesh mesh;
71         std::vector<boundaryCond_t> BCs;
72         void assign_BC(boundaryCond_t BonCon)
73         { BCs.push_back(BonCon); }
74         void print();
75     };
76
77     int main( int argc, char** argv)

```

```
78 | {  
79 |  
80 |     return 0;  
81 | }
```