HW – 5 (Due April 27th 2018)

1) Write down the steady state diffusion equation in presence of fission source. (10 pts)

2) Write down weak form of the equation you have in 1 (10 pts)

3) Now, derive element-wise discrete form of this equation using hat function as weight and trial function. (10 pts)

4) Now assemble the global matrix and write down the global matrix system. (10 pts)

5) Describe a solver you will use to solve this global matrix system (your choice – Jacobi, Gauss-Seidel, Multigrid, Conjugate Gradient, GMRES, Cholesky, LU decomposition...choose one). (10 pts)

6) You have an option here (50 pts)

Attend all classes thro till April 27th …. I’ll take attendance starting next class (April 13th)

OR

Write a FEM code to solve steady state diffusion equation without fission.

\Sigma\_a = 0.1

\Sigma\_t = 1

Slab Length = 10

Source = 1 (uniform)

Vacuum boundaries on both sides

Verify your code using trend test, symmetry test and method of exact solutions

Note: See the file I’ve uploaded on D2L for help (it has a fortran code, and reference solution)