NUCL 511 Project Plan

3/10/14

General Decisions

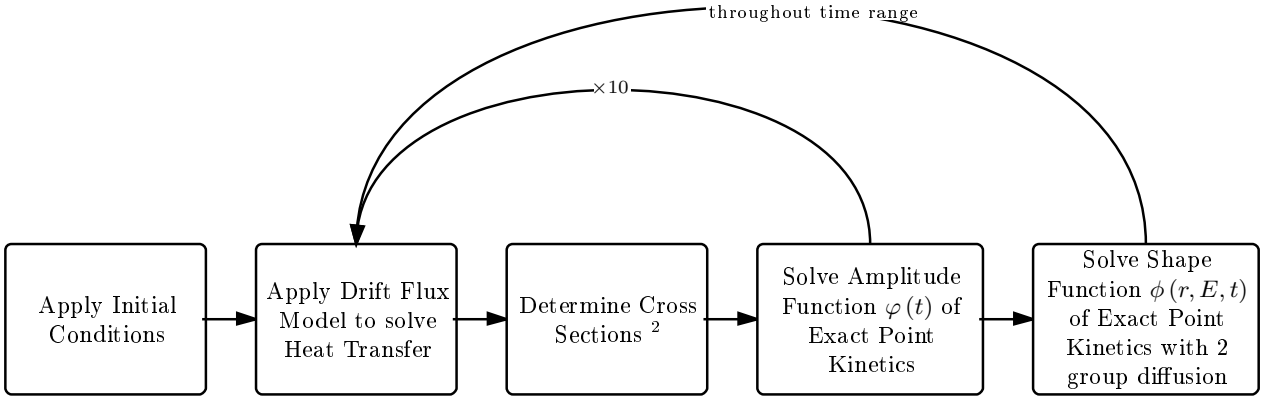
Programming Language MATLAB for prototypes, will port to FORTRAN if needed for performance

Reactor Type BWR, GE 9x9 or similar[1]

Initial Conditions Start at critical, steady state, full power before adding a reactivity to the system

Code Design and Prototype

Algorithm 1 General Methodology for Coupling Heat Transfer and Exact Point Kinetics



Modules

Drift Flux and Heat Conduction Module

```
[T,alpha,rho]=heattrans(P,shape);
T,alpha,rho = [z1,z2,...,zn; T1,T2,...,Tn];
```

Cross Section Generation and Homogenization Module

```
[Sigma_a,nuSigma_f,Sigma_s,D]=crosssection(T,alpha,rho);
Sigma_a,nuSigma_f,D = [1,2];
Sigma_s = [1-1,1-2;2-1,2-2];
```

Amplitude Function Module

```
[P]=ampfunc(Sigma_a,nuSigma_f,Sigma_s,reactivity);
```

[1] Need axial dimension of these fuel assemblies. Also could require radial dimensions of fuel and cladding for cross section homogenization.

[2] Ask Dr. Yang about homogenization from 3-d to 1-d cross sections

Shape Function Module

```
[shape]=shapefunc(Sigma_a,nuSigma_f,Sigma_s,D);
shape = [z1,z2,...,zn; phi1,phi2,...,phin];
```

Calendar

Week of 3/14 Ask Dr. Yang questions relating to cross section homogenization

Week of 3/28 Meet to discuss progress on personal sections

Week of 4/11 Have personal code section completed

Week of 4/25 Have verification and validation completed

Week of 5/2 Finish report