



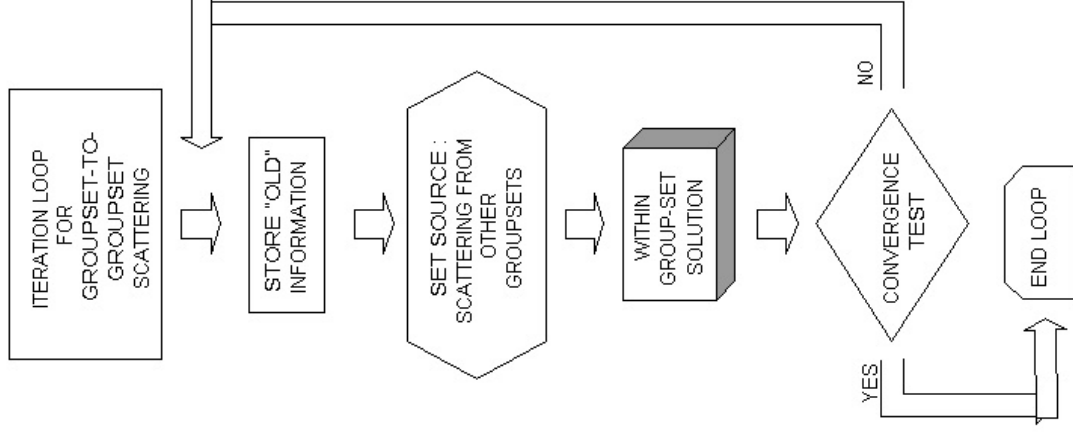
Transport Work Functions

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Solver Routines

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- Loop across energy group sets
 - Solve **in-scattering source**
 - Cell sets and group sets
 - Compute macroscopic cross section for each cell
 - Solve within each energy group set
 - Solve for **total sources**
 - Fixed source
 - In-scattering source
 - Within group set scattering source
 - **Sweep**



Sweep Function

- Solves for a single sub problem – chunk
(group set and cell set)
- Each group set has same quadrature order
 - Loop over elements
 - Loop over angles
 - Loop over groups
 - Solve for exiting angular fluxes
 - Build angular moments for each element

Sweep Function



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```
for(vector<BaseCell*>::iterator cit=chunk.order.begin();
    cit<chunk.order.end(); ++cit){
    :
    :
    for(vector<BaseElement>::iterator eit=cell.first_element();
        eit<cell.first_element()+cell.element_count(); ++eit){
        :
        :
        for( int j = 0; j < angle.size(); ++j ) {
            :
            :
            for( int k = 0; k < group.size(); ++k ) {

                // calculate the exiting angular fluxes
                pe_x(j,k) = (2.0/(1.0+_alpha)) * mp -
                    ((1.0-_alpha)/(1.0+_alpha)) * psiface_inc_x(j,k);
                pe_y(j,k) = (2.0/(1.0+_beta)) * mp -
                    ((1.0-_beta)/(1.0+_beta)) * psiface_inc_y(j,k);
                pe_z(j,k) = (2.0/(1.0+_gamma)) * mp -
                    ((1.0-_gamma)/(1.0+_gamma)) * psiface_inc_z(j,k);

            }
        }
    }
}
```

Chunk Object



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- Energy group information
- Angular information
- Spatial information
 - Ordered list of cells traversed by the sweep function

Boundaries



- Pointer assignments of boundary and exiting angular fluxes to downstream incident angular fluxes
- Message buffers
- Pointers to message buffers for angular fluxes on other processors
- Message buffers and pointer assignments handled by routines above the sweeper



Boundaries

29		30		31		32			
25		26		27		28			
21		22		23		24			
17		18		19		20			
13		14		15		16			
9		10		11		12			
5		6		7		8			
1		2		3		4			
5	6	7	8						

Parallelism



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- Transparent to parallelism
- Scheduler
 - Domain decomposition
 - Sweep order
- STAPL
 - Executes the sweep function in parallel

Sweep Function

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- Loops over cells, angles, and energy groups
- Transparent to boundaries and parallelism
- Easy to implement other spatial discretizations