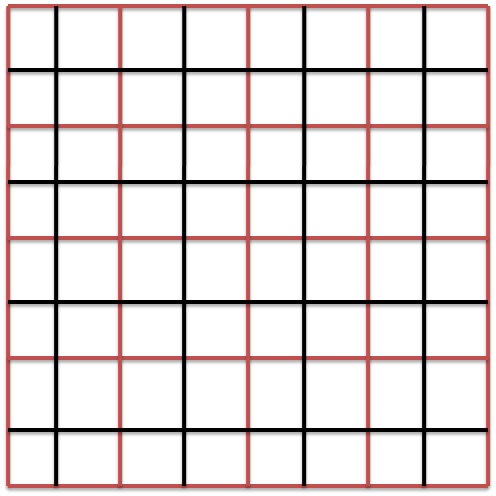
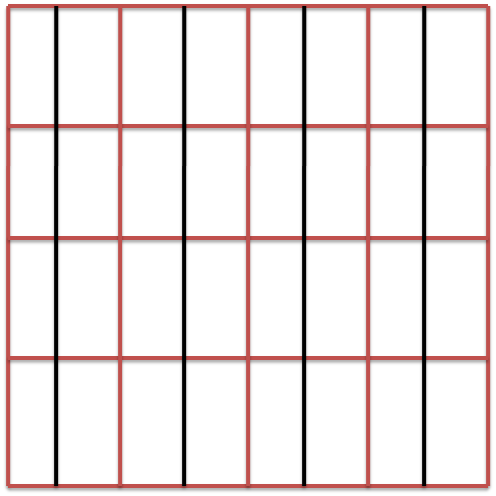
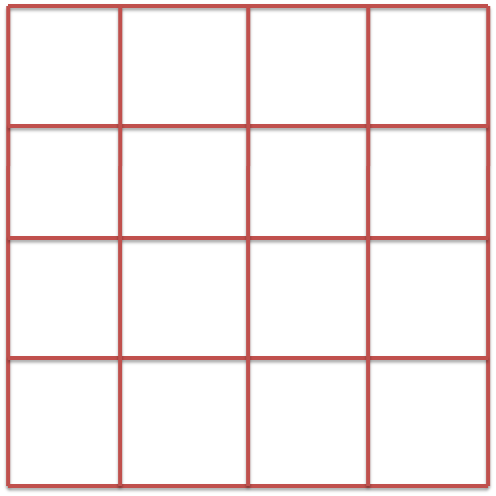
Multi-Grid Implementation

This document explains how the myMG module was developed.

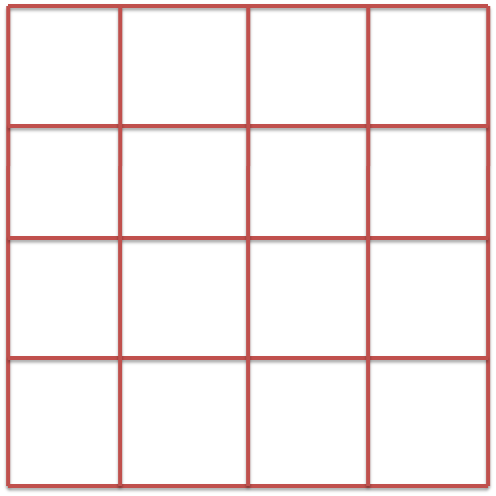
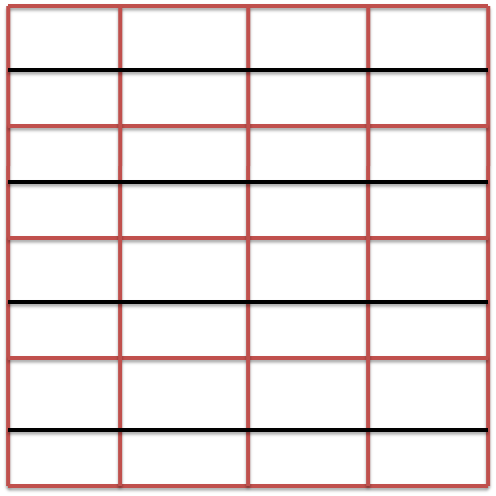
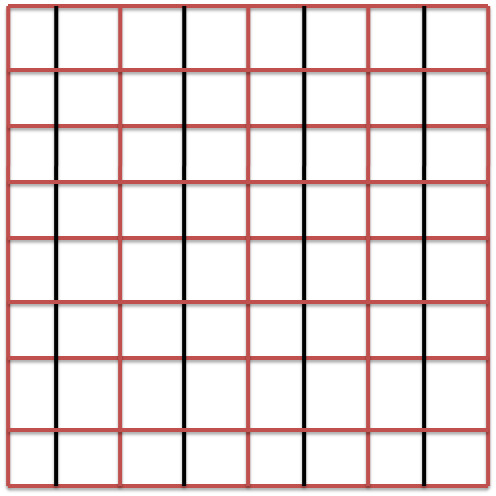
# Prolongate (interpolation)

In order to prolongate, a routine was developed to linearly interpolate along one direction at a time:



# Restriction

In order to restrict, a routine was developed to linearly interpolate and then average local function values along one direction at a time:



Linearly interpolating we have

Solving for the interpolated value yields

Where

So the value of the restricted field is

# V-Cycle (one level deep)

1) Smooth solution

2) Calc residual

3) Restrict residual

4) The error needed to correct the solution satisfies Laplace's equation where the source term is the residual!

5) Solve for error with initial guess of zero:

6) Prolongate coarse correction

7) Correct solution

8) Final smoothing

# MGCycle