

---

Josh nolting  
**HP Local Refinement Using FOSLS**

2467 East 127th Court  
Thornton  
co 80241  
`josh.nolting@colorado.edu`  
Thomas Manteuffel

Local refinement enables us to concentrate computational resources in areas that need special attention, for example, near steep gradients and singularities. In order to use local refinement efficiently, it is important to be able to quickly estimate local error. FOSLS is an ideal method to use for this because the FOSLS functional yields a sharp a posteriori error measure for each element. This talk will discuss a strategy for determining which elements to refine in order to optimize the accuracy/computational cost. Set in the context of a full multigrid algorithm, our strategy leads to a refinement pattern with nearly equal error on each element. Further refinement is essentially uniform, which allows for an efficient parallel implementation. Numerical experiments will be presented.