Ben Southworth

Parallel-in-time for moving meshes

2805 Olson Dr
Boulder
CO
ben.s.southworth@gmail.com

With steadily growing computational resources available, scientists must develop effective ways to utilize the increased resources. High performance, highly parallel software has become a standard. However until recent years parallelism has focused primarily on the spatial domain. When solving a space-time partial differential equation (PDE), this leads to a sequential bottleneck in the temporal dimension, particularly when taking a large number of time steps. The XBraid parallel-in-time library was developed as a practical way to add temporal parallelism to existing sequential codes with only minor modifications. In this work, a rezoning-type moving mesh is applied to a diffusion problem and formulated in a parallel-in-time framework. Tests and scaling studies are run using XBraid and demonstrate excellent results for the simple model problem considered herein.