1014-49-357 **Matthias Heinkenschloss*** (heinken@rice.edu), CAAM Dept - MS134, Rice University, Houston, TX 77005. *Spatial Domain Decomposition and Model Reduction for Parabolic Parameter Identification Problems.*

We consider the identification of distributed parameters in parabolic partial differential equations (PDEs). We use a regularized least squares approach to formulate the identification problem as an optimization problem and then integrate an optimization-level spatial domain decomposition method (DDM) with model reduction for the efficient solution of parabolic parameter estimation problems.

The motivation for this work is threefold. First, our approach addresses the storage issue that arises in the numerical solution of time dependent optimization problems. Secondly, our DDM introduces parallelism at the optimization level. The third motivation arises from the availability of sensor networks that offer in-network computing capabilities, allow neighbor-to-neighbor communication, but for which communication among distant nodes is prohibitive because of communication bandwidth and battery power limitations. Our approach offers the possibility for in-network computing, in which the global problem is solved using spatially distributed processors that communicate primarily with their immediate neighbors.

Our approach is illustrated using model problems in which we want to identify the source of pollutant from measurements of the concentration. (Received September 12, 2005)