1126-65-13   **Giacomo Capodaglio*** (`giacomo.capodaglio@ttu.edu`), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409, **Eugenio Aulisa** (`eugenio.aulisa@ttu.edu`), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409, **Giorgio Bornia**, Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409, and **Sara Calandrini**, Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409. *Convergence estimates for a multigrid algorithm with domain decomposition smoother.*

In this talk we present convergence estimates for a multigrid algorithm with domain decomposition smoother applied to symmetric elliptic PDEs. First, we reconsider a general convergence analysis on a class of multigrid algorithms, in a fairly general setting where no regularity assumptions are made on the solution. In this framework we explicitly highlight the dependence of the multigrid error bound on the number of smoothing steps. We observe that an increase in the number of smoothing steps can improve the convergence rate, a result that was already known in the literature although not yet shown under no regularity assumptions. A second purpose of this work is to fit the domain decomposition theory in the multigrid context, choosing the smoother of the multigrid to be a multiplicative Schwarz type algorithm. We conclude with uniform and local refinement applications of the general theory where we explicitly derive bounds for the multigrid error. (Received October 25, 2016)