Asynchronous optimized Schwarz methods for the solution of PDEs on bounded domains

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Asynchronous methods refer to parallel iterative procedures where each process performs its task without waiting for other processes to be completed, i.e., with whatever information it has locally available and with no synchronizations with other processes. In this talk, an asynchronous version of the optimized Schwarz method is presented for the solution of differential equations on a large parallel computational environment. Convergence is proved under very mild conditions on the size of the subdomains, when optimal as well as approximate (non-optimal) interface conditions are utilized for Poisson's equation (and others) on the plane and on bounded rectangular domains. Numerical results are presented on large three-dimensional problems illustrating the efficiency of the proposed asynchronous parallel implementation of the method.