Development of Solid Earth Simulator GeoFEM (Procedures for Large-Scale Parallel Computation)

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In large-scale scientific computing, linear sparse solver is one of the most time-consuming process. In GeoFEM, various types of preconditioned iterative method is implemented on massively parallel computers. It has been well-known that ILU(0) factorization is very effective preconditioning method for iterative solver. But it's also well-known that this method requires global data dependency and this is not the optimal way on parallel computers where locality is of utmost importance. In this paper, "Localized" ILU(0) preconditioning method has been implemented to various type of iterative solvers. This method provides data locality on each processor and good parallelization effect. Developed system performance has been also evaluated on workstation cluster with MPI.