# A Three-Level extension for the Fast and Robust Overlapping Schwarz (FROSch) preconditioner

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The Fast and Robust Overlapping Schwarz (FROSch) framework in the Trilinos software library contains a parallel implementation of the two-level GDSW overlapping Schwarz preconditioner using an energy-minimizing coarse space. It can be constructed algebraically from the assembled matrix. To improve the parallel scalability of the two-level method, a three-level extension has been introduced, recently. Numerical results in two and three dimensions are presented. A further improvement of the scalability can be obtained by an approach using a reduced coarse space. Results for the three- and two-level method applying the reduced coarse space are also presented. Regarding the size of the coarse problem, the new methods can be expected to scale when the classical method will be out of memory.

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