Comparison of different AMG implementations for non-symmetric problems in CFD

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In our approach to multiphase flow simulations, we encounter the well-known convection-diffusion equation and a weighted sum of diffusion operators, with one diffusion term per phase. In our finite volume discretization, both (scalar) equations result in non-symmetric linear systems.

We applied the AMG implementations BoomerAMG, ML, GAMG and AGMG as well as our finite volume based aggregation scheme to a number of test cases. The presentation contains the obvious convergence comparisons in terms of number of iterations, sequential wall-clock times and memory consumption, and also some remarks on usability from a user's point of view.