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**An Algebraic Multigrid Solver for Fully-Implicit Solution
Methods in Reservoir Simulation**

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The linearized equations of oil reservoir simulations often yield a complex Jacobian linear system that is challenging to solve by iterative methods. We present our efforts to develop an AMG-preconditioned Krylov method for directly solving the original discretized system. The preconditioner is designed to represent the coupling between the physical variables and account for the underlying physics of the system. We present performance results for the solver on challenging applications emerging from reservoir simulations.