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Jacobian Free Rosenbrock time-stepping for compressible geophysical fluid flows

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Different PDEs, different discretizations, different adaptive techniques... In this talk, efforts are directed towards a general and efficient linearly semi-implicit time-stepping technique adaptable to a large class of problems. Using Rosenbrock-W methods and ideas from Jacobian free approaches for nonlinear equations an efficient time-stepping procedure is constructed. Simple approaches for preconditioning the resulting linear system are discussed and an application to a high-order discontinuous Galerkin nonhydrostatic mesoscale model is presented.