

Numerical evolution of the resistive relativistic magnetohydrodynamic equations: a minimally implicit Runge-Kutta scheme.

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I will present the theoretical development of Minimally-Implicit Runge-Kutta (MIRK) methods for the numerical evolution of the resistive relativistic magnetohydrodynamic equations. Previous methods rely on Implicit-Explicit (IMEX) Runge-Kutta schemes and need to apply the recovery of the primitive variables from the conserved variables in numerous additional times. This recovery can potentially have convergence problems due to the use of iterative methods. Moreover, the computational cost of the previous IMEX methods in comparison with explicit ones is much higher. The MIRK methods reduce the number of recoveries needed and can be easily adapted from explicit schemes.