Energy stable methods for convex gradient problems

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ABSTRACT

We propose a class of Runge–Kutta methods which provide a simple unified framework to solve the convex gradient flow in an unconditionally energy stable manner. Stiffly accurate Runge–Kutta methods are high order accurate in terms of time and also assure the energy stability for any time step size when they satisfy the positive definite condition. We provide a detailed description of the unconditional energy stability as well as unique solvability.

REFERENCES