A new SAV-based minimization algorithm for discrete gradient system

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In this talk, we introduce a new minimization algorithm for discrete gradient systems arises from optimization, utilizing a modified scalar auxiliary variable (SAV) approach, a relaxation step, and an adaptive strategy. This method offers unconditional energy diminishing and allows for large step-size utilization, resulting in accelerated convergence rates. We will discuss the convergence analysis of various SAV-based algorithms and show the robustness and efficiency of our proposed algorithm through comparisons with popular gradient-based methods in some benchmark problems.