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A Double-Inertial Mixed Extragradient Method for Solving Bilevel Split Variational Inequality Problems and Finite Family of Fixed Points of Demicontractive Mappings

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This paper proposes a double-inertial mixed extragradient algorithm for solving bilevel split variational inequality problems (BSVIPs) and finding a common solution to a finite family of $k-$demicontractive mappings. The proposed method combines Tseng's extragradient technique for the upper-level problem with the subgradient extragradient method for the lower-level problem. We establish the strong convergence of the generated sequence to the unique solution of the BSVIP without requiring the computation or estimation of the norm of the bounded linear operator. Furthermore, the algorithm incorporates a double-inertial adaptive step size to accelerate convergence and eliminates the need for restrictive assumptions such as Lipschitz continuity or co-coercivity of the involved operators.

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