Finding Nash-Stampacchia equilibrium points of Hirschleifer games using numerical algorithms

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This paper discusses the problem of finding Nash-Stampacchia equilibrium points of Hirschleifer games using numerical algorithms such as Quasi-Newton method and Nelder Mead algorithm. Nash equilibrium points are a subset of Nash-Stampacchia equilibrium points, which can be obtained as solutions of variational inequalities. These inequalities correspond to critical points of the payoff functions. Various numerical algorithms have been studied to find these critical points. The Nelder Mead algorithm is found to be one of the best options because it does not require gradients which makes it suitable to study on hyperbolic spaces as well. This study provides a detailed analysis of the results. We also present the Nelder Mead algorithm on Hadamard manifolds, more precisely on Poincaré modell.