EXTRAGRADIENT AND LINESEARCH ALGORITHMS FOR SOLVING EQUILIBRIUM PROBLEMS, VARIATIONAL INEQUALITIES AND FIXED POINT PROBLEMS IN BANACH SPACES

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Abstract. Using generalized metric projection, new extragradient and linesearch algorithms are presented for finding a common element of the solution set of an equilibrium problem and the solution set of variational inequality problem which is also an element of the set of fixed points of a weakly relatively nonexpansive mapping in Banach spaces. To prove strong convergence of the iterates in the extragradient method, a \( \phi \)-Lipschitz-type condition is introduced and is assumed that the equilibrium bifunction satisfies in this condition. To avoid using this condition, the linesearch method is applied instead of the extragradient method. Using FMINCON optimization toolbox in MATLAB, some numerical examples are given to illustrate the usability of obtained results.

Key Words and Phrases: Equilibrium problem, extragradient method, \( \phi \)-Lipschitz-type, generalized metric projection, linesearch algorithm, relatively nonexpansive mapping.

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REFERENCES


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