ABSTRACT

In this thesis, several methodologies have been proposed to solve the different types of game theory problems under fuzzy environment. Analytic Hierarchy Process has been applied to find out the weigths to solve the two-person zero-sum game with multiple payoffs. Considering the triangular and trapezoidal fuzzy numbers for the payoff matrix in two-person zero-game, the formulated models have been solved by parametric programming approach. Co-operative fuzzy game theoretic approach has been applied to solve some multi-objective linear and non-linear programming problems. In non co-operative games, Nash equilibrium solutions have been calculated for multi-objective bimatrix games in fuzzy environment. Fuzzy programming method has been applied to find out the Stackelberg equilibrium solutions for bimatrix games and for bi-level programming problem. By considering the elements of the payoff matrix as crisp and fuzzy numbers, two differnt ways have been applied to analyze two-person multicriteria bimatrix games. Weighting method has also been applied to solve some of the above proposed models. All the forgoing proposed method are illustrated by means of suitable numerical examples. Finally, an overall concluding remark has been made and scopes of future directions of investigation have been highlighted.

Keywords: Multi-Criteria Decision Making, Game Theory, Fuzzy Programming, Analytic Hierarchy Process, Parametric Programming, Weighting Method, Utility Theory, Nash Equilibrium Solution, Pareto Optimal Solution, Stackelberg Equilibrium Solution, Pareto Fuzzy Equilibrium Solution.