# Abstract

In general, parameters of a general optimization problem are fixed real numbers. However, most of the real life optimization models have uncertain parameters due to the presence of indistinct information in the data set. In some situations, it is possible for the decision makers to estimate the lower and upper bounds of these parameters from historical data and represent these parameters as closed intervals. In that case the optimization problem is called as an interval optimization problem.

Linear interval optimization problems have been studied by several researchers during last few decades. In this thesis we consider nonlinear interval optimization problems whose objective function and constraints are interval valued functions. In the beginning of the thesis, concepts of limit, continuity and differentiability of interval valued functions are developed. Conditions for the existence of solutions of different interval optimization problems are studied using these concepts. In consequent chapters, methodologies are developed to transform different interval optimization problems to deterministic optimization problems which are free from interval uncertainties. Further, relations between the solution of the original problems and the corresponding deterministic problems are established. All the methodologies are illustrated through various numerical examples. Towards the end of the thesis, three types of duals for a general nonlinear interval optimization problem are constructed and primal-dual relations are studied. Following nonlinear interval optimization models are discussed in the thesis.

- Single objective general nonlinear optimization model
- Single objective fractional optimization model
- Multi-objective general nonlinear optimization model
- Multi-objective fractional optimization model