

# Interval Arithmetic Technique for Constrained Reliability Optimization Problems

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*Abstract*—Constrained reliability optimization problems have been studied in great detail for different system configurations, problem types, and optimization techniques. Only few techniques have demonstrated to be effective when applied to large scale nonlinear programming problems for system reliability with unit redundancy. Another drawback is that the solutions are non integers and hence the true optimal solution which must be integer is not guaranteed. One commonly used method is the Lagrangian multipliers method. In recent years, interval techniques have proved to be effective solving nonlinear global optimization problems. In this paper, an interval arithmetic technique will be introduced both to minimize the total system cost of achieving unit redundancy configuration, and to maximize the total system reliability. The results of this interval solution technique will be compared with those obtained from the Lagrangian multipliers method.