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(57) Abstract :
ENTROPY BASED REGION REDUCING GENETIC ALGORITHM FOR RELIABILITY REDUNDANCY ALLOCATION IN INTERVAL ENVIRONMENT Embodiments present a multi-objective reliability redundancy allocation problem for optimum system reliability and system cost with limitation on entropy of the system which is very essential for effective sustainability. Both crisp and interval-valued system parameters are considered for better realization of the model in more realistic sense. Embodiments propose that the system cost of the redundancy allocation problem depends on reliability of the components. A subpopulation and entropy-based region reducing genetic algorithm (GA) with Laplace crossover and power mutation is proposed to determine the optimum number of redundant components at each stage of the system. The approach is demonstrated through the case study of a break lining manufacturing plant. A comprehensive study is conducted for comparing the performance of the proposed GA with the single-population based standard GA by evaluating the optimum system reliability and system cost with the optimum number of redundant components. Set of numerical examples are provided to illustrate the effectiveness of the redundancy allocation model based on the proposed optimization technique. We present a brief discussion on change of the system using graphical phenomenon due to the changes of parameters of the system. Comparative performance studies of the proposed GA with the standard GA demonstrate that the proposed GA is promising to solve the reliability redundancy optimization problem providing better optimum system reliability. FIGURE 1, 2

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