

## عنوان مقاله:

Gas Turbine Preventive Maintenance Optimization Using Genetic Algorithm

## محل انتشار:

چهارمین کنفرانس بین المللی مهندسی قابلیت اطمینان (سال: 1395)

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## خلاصه مقاله:

The tremendous impact of an optimized maintenance program on system overall cost and reliability leads various industrial managers and owners to seek an intelligent tool for maintenance decision making. Gas turbine industry is no exception, since it is of the most expensive and critical components in both power plant and oil and gas industries. In this paper an intelligent maintenance optimization tool is developed based on genetic algorithm. Genetic algorithm is a heuristic optimization method in which genetic evolution patterns are employed. The algorithm has been used for solving several optimization problems and its ability to find optimized solutions makes it one of the most used algorithms. The main purpose of proposed algorithm is to make the balance between maintenance costs (i.e. direct and indirect) and down time cost while maintaining system availability on predefined level. Moreover, maintenance constraints such as task interval, maintenance duration are considered. To handle these constraints, new repair operators are defined and applied in the proposed genetic algorithm, besides other crossover and mutation operators. In order to verify and validate the novel developed algorithm, results of its implementation on a gas turbine case study are discussed. The case study is a maintenance optimization problem of Siemens SGT600 gas turbine, comprised of seventeen components and their maintenance activities, two life wear patterns and four production loss scenarios. Results of the optimized solution are compared with gas turbine conventional maintenance plan which is proved to have considerable improvements. It is shown that an optimized maintenance plan would reduce outage time and also increase the availability, which is mainly due to grouping maintenance activities. Besides, reduction in total cost including maintenance costs and production loss cost are of economic consequences of using proposed algorithm. Total cost is reduced more than 80% while availability is improved roughly 2%.

## کلمات کلیدی:

Maintenance optimization, Gas Turbine

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