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OPTIMAL MAINTENANCE SCHEDULING BY AVERAGE SYSTEM AVAILABILITY THROUGH APPROPRIATE SEGMENTATION OF MAINTENANCE INTERVALS

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Abstract. *For stable operation of industrial systems, adequate maintenance of the systems is essential. Through a maintenance plan, it is expected not only to keep the system reliability but also to reduce the total cost of maintenance and expected loss due to failures. In this research, a maintenance scheduling method is proposed, which reduces the total number of maintenance by flattening element reliability while intact with current level of system reliability. To obtain the optimal maintenance scheduling, it is assumed that the maintenance can improve the system reliability. In order to satisfy the assumption, a segmentation method of the maintenance interval is proposed. By using the proposed segmentation method of the maintenance interval, a monotonously increasing relationship between the maintenance interval and the failure rate can be achieved. The proposed optimal maintenance interval is applied to the actual data of equipment in thermal power stations and it shows encouraging results.*

Keywords: Maintenance scheduling, Equipment reliability, Appropriate segmentation, Maintenance interval

1. **Introduction.** Adequate maintenance of equipment is essential for stable operation of industrial systems. Maintenance cost and expected loss due to failures have a relation of antinomy. The maintenance cost, i.e., frequency of maintenance is increased, the expected loss caused by failures is decreased due to reduction in failure probability. On the other hand, the maintenance cost is decreased, the expected loss due to failures is increased. Hence, the existing trade off would give rise to an optimal maintenance schedule. Maintenance scheduling for actual industrial systems is usually based on legal restrictions, precedences and the experience of operators, Therefore such maintenance schedule is not always an optimal.

Concerning the past research attempts on maintenance scheduling, the paper [1] reviews the most frequently used maintenance strategies. Lapa et al. [2] proposed a methodology for preventive maintenance policy evaluation based upon a cost-reliability model with GA. In [3], availability maximization was adopted as a criterion for scheduling periodical preventive maintenance considering three actions, mechanical service, repair and replacement based on availability. Chattopadhyay et al. [4] proposed a least-cost generating unit maintenance scheduling for interconnected power systems. A mixed integer programming