

MS-E2191 - Graduate Seminar on Operations Research

Homework 14 Model Solution

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Briefly explain why the policy-iteration algorithm outperforms the simple and heuristic opportunistic policy.

The two policies were compared in terms of the total cost and the number of average wheels failures per thousand kilometers during 5 million kilometers.

Policy-iteration algorithm presented is shown to minimize the long run average cost per time unit, i.e. it is (more or less) optimal in terms of the total cost under the assumption that the time interval is sufficiently long. This is not the case for the simple policy.

The simple policy resulted in less failures in most of the simulations. However, this increase was inconsistent and both strategies satisfied the reliability threshold. Thus, the component-level approach of the simple policy leads to excessive maintenance compared to the group-level approach of the policy iteration algorithm.

Why, in some cases should you still consider the simple policy over the presented policy-iteration algorithm?

Policy iteration algorithms are generally very computationally heavy. Thus a large problem would motivate the use of a simple policy.

Other well rationalized explanations suffice for full marks.