
Extended Formulation for Maintenance Planning at Power Plants

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Résumé

We consider the large-scale power plant maintenance scheduling and production planning problem submitted by EDF to the 2010 Euro/Roadef Challenge. Two types of power plants are used to satisfy a customer demand over a specific time horizon. Type 1 plants can operate continuously while Type 2 plants have to be shut down regularly for refuelling and maintenance, and cannot produce during outage periods. The decision to be made consists of the dates of outages, the amount of refuel for Type 2 plants, and production level for both types of plants. The objective is to minimize the average cost of refuelling and production on various demand scenarios. In this work, we discuss simplifications to the problem that allow us to develop a column generation approach based on an extended formulation. With this approach, the Roadef Challenge instances can be solved within a few minutes into their deterministic version on a time horizon limited to three years, which is within the time frame of the operational tools currently used by EDF. The approach could account for various demand scenarios. This approach has been used in our further work on dynamic re-optimisation using a rolling horizon framework.

Mots-Clés: energy, electricity production, maintenance planning, column generation, rolling horizon

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