

Optimization of Multi-reservoir Operation by Stochastic Dynamic Programming for Moragolla Hydropower Project in Sri Lanka

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○ Keywords

reservoir operation, optimization, hydropower, stochastic dynamic programming

○ Outline

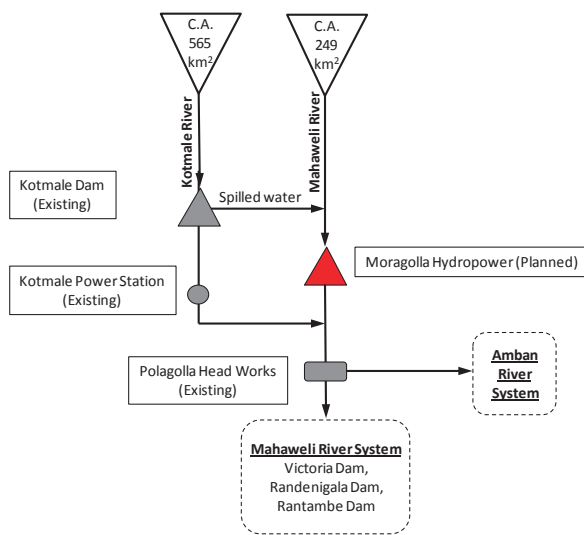
Development of new hydropower project into an existing river management system sometimes impair the original purpose of the existing system, especially the new project was not considered in the original design of the river system. It is ideally imperative that the operation performance of existing facilities with planned new facilities is optimized together. However, it is practically difficult to optimize complex river management system without efforts to reduce the time for computation of the modern desktop computers.

In the article, the optimization study for the Moragolla hydropower project in Sri Lanka is introduced in detail. The project is a newly planned hydropower project in the Mahaweli river system and the project was not originally designed during the first planning of the river management. Therefore the optimization is done with existing facility in the study. This article introduces the study as an example for multi-dimensional optimization.

○ Technical Points

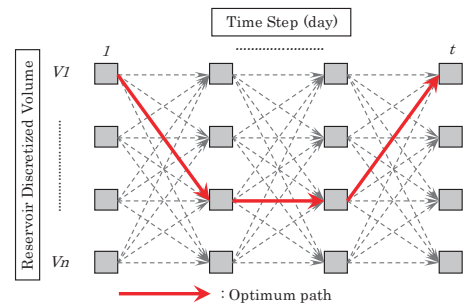
This article explained as an example of limiting the number of multi-dimension problem. The optimization algorithm applied for the problem is stochastic dynamic programming (SDP). The program algorithm of SDP is expanded for n-dimension problems and applied for a feasibility study of the planned hydropower project, namely Moragolla Hydropower Project. In the study, daily operation of an existing hydropower and the planned Moragolla hydropower is simultaneously optimized with the multi-dimension SDP.

○ Figure, table, and picture

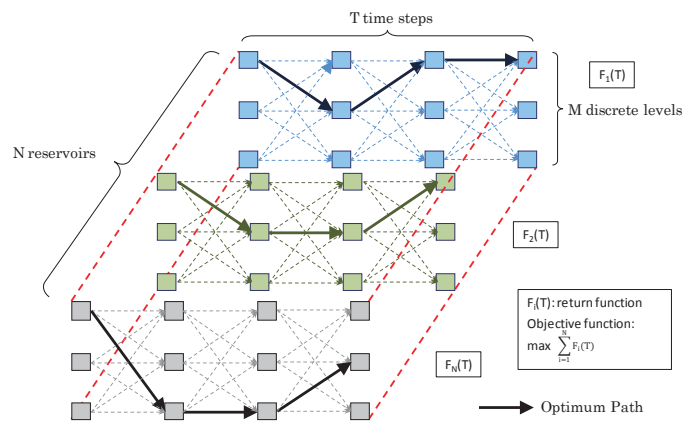


The River System of the Study Area

A new hydropower project is planned at the downstream of the existing reservoir type hydropower station. The study is carried out to assess the influence of the existing Kotmale dam operation to the planned Moragolla hydropower and determined whether the operation of Kotmale hydropower should be considered of the Project.



Single Reservoir Optimization



Multi-Reservoir Optimization