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A Model for a Linked System of Multi-Purpose Reservoirs with Stochastic Inflows and Demands

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- Full Text

In Chapter I of this report a model of a single multi-purpose reservoir with stochastic inflows is addressed. The objective of the model is the development of an optimal operating policy for given time sequence of minimum and maximum reservoir levels. The unregulated inflow into the reservoir is assumed to be stochastic with known distribution for each time period.

The significant difference between this model and those of previous investigators is that no linear decision rule is utilized. Instead, the approach is based on the distribution of the sum of the inflows over successive time periods. The resultant reservoir release variables are no longer stochastic values as they were in previous models.

The resultant constraint set forms a linear system of equations. Stochastic demands as well as inflows also are considered in the paper. Example problems are presented to illustrate the models.

In Chapter II, a single multi-purpose reservoir model with stochastic inflows is extended to a connected system of such reservoirs. The reservoirs are considered to be linked by a system of pumping canals and normal river reaches. The objective of the model is the optimal operation of the total system subject to certain restrictions on reservoir operations.

The linked system model is a natural extension of the single reservoir model proposed in Chapter I. The resulting constraints for the problem are linear and the decision variables are deterministic rather than random variables. Thus, linear, quadratic or even general convex objective functions can be handled readily.

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