

Evaluation of Real-Time Operation Rules in Reservoir Systems Operation

Y. Bolouri-Yazdeli · O. Bozorg Haddad ·
E. Fallah-Mehdipour · M. A. Mariño

Received: 8 February 2013 / Accepted: 29 December 2013
© Springer Science+Business Media Dordrecht 2014

Abstract Reservoir operation rules are logical or mathematical equations that take into account system variables to calculate water release from a reservoir based on inflow and storage volume values. In fact, previous experiences of the system are used to balance reservoir system parameters in each operational period. Commonly, reservoir operation rules have been considered to be linear decision rules (LDRs) and constant coefficients developed by using various optimization procedures. This paper addresses the application of real-time operation rules on a reservoir system whose purpose is to supply total downstream demand. Those rules include standard operation policy (SOP), stochastic dynamic programming (SDP), LDR, and nonlinear decision rule (NLDR) with various orders of inflow and reservoir storage volume. Also, a multi-attribute decision method, elimination and choice expressing reality (ELECTRE)-I, with a combination of indices, objective functions, and reservoir performance criteria (reliability, resiliency, and vulnerability) are used to rank the aforementioned rules. The ranking method employs two combinations of indices: (1) performance criteria and (2) objective function and performance criteria by using the same weights for all criteria.

Y. Bolouri-Yazdeli · O. Bozorg Haddad (✉) · E. Fallah-Mehdipour
Department of Irrigation & Reclamation Engineering, Faculty of Agricultural Engineering & Technology,
College of Agriculture & Natural Resources, University of Tehran, Karaj, Tehran, Iran
e-mail: OBHaddad@ut.ac.ir

Y. Bolouri-Yazdeli
e-mail: Y_Boulori@yahoo.com

E. Fallah-Mehdipour
e-mail: Falah@ut.ac.ir

M. A. Mariño
Department of Land, Air & Water Resources, University of California, 139 Veihmeyer Hall, Davis, CA
95616-8628, USA
e-mail: MAMarino@ucdavis.edu

M. A. Mariño
Department of Civil & Environmental Engineering, University of California, 139 Veihmeyer Hall, Davis,
CA 95616-8628, USA

M. A. Mariño
Department of Biological & Agricultural Engineering, University of California, 139 Veihmeyer Hall, Davis,
CA 95616-8628, USA