

## **Fuzzy Logic Model for Multi-Reservoir Operation**

PROF.S.MOHAN<sup>1</sup> and M.ANJANEYA PRASAD<sup>2</sup>

<sup>1</sup>*Professor and Head, Department of Civil Engineering, I.I.T. Madras, India*

<sup>2</sup>*Research Scholar, E.W.R.E.Division, Department of Civil Engineering, I.I.T. Madras, India*

Reservoirs are built usually to serve multiple purposes. viz. irrigation, municipal and industrial water supply, hydro-power and flood control. Due to high variability of annual rainfall and conflicting demands on scarce water resources, the study and operation of reservoir systems has assumed great significance to meet the short term and long-term requirements. The reservoir managers do not find previous techniques of complex optimization models are difficult to adopt practically. New methods have to be developed which are simple to understand and can be effectively adopted for the existing systems. Any reservoir problem is usually site specific in nature and hence any general modeling methodology cannot be directly applied to study the system behavior. There is also emphasis on improvement in linkage with simulation models that operators readily accept. The Fuzzy rule based systems are very much suitable for inferring developed operating policies. In the present work a rule based fuzzy model is attempted for long-term operation a multi reservoir system. The present model was developed on monthly basis for operation and the model was demonstrated with a case of two serial reservoirs on River Godavari sub system located in South India. In recent years, data driven modelling is emerging, where in the data is used to evolve the model. Here the data that comprises of a source of information for the development of model and to build a rule base to simulate the operation of reservoir systems. The recent artificial intelligence tools like Genetic programming, Artificial Neural networks and Fuzzy logic are increasingly used as soft computing techniques to address modelling issues. The main advantage of these techniques lies in handling noisy data, addressing non - linear and dynamic systems. These tools also useful when it is difficult to explain the physical relationship are not fully understood. In order to enhance the performance of the system, it is important to operate the reservoirs in integral manner when they are connected. The present paper is aimed to present a fuzzy logic methodology for long-term reservoir operation. In this method a monthly fuzzy rule based model was developed based on the historical operation. The performance of the model was tested with calibrated period and validation period.

**Keywords:** Reservoirs, System; Integrated operation; Fuzzy logic; Artificial intelligence