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Optimized linear model Muskingum parameters

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Abstract

Flood routing, has many applications, in matters relating to engineering projects and helps to designer for identify the effects of flood flows in the river. One of the common methods in flood routing is Muskingum that based on flood characteristics and continuity equation to be provided routing unsteady flows. In the present study, different techniques to estimate the parameters of these methods in addition to the principles explaining the Muskingum methods have been used. The results for two different data sets Bvanlu River, superior method of least squares and correlation coefficients are shown.

Keywords: Flood Routing, Unsteady Flow, Muskingum method, Parameter s Optimizing, HEC-HMS.

1. INTRODUCTION

As an Importance unsteady flow refers to a situation in which increase unexpectedly the river discharge and the water level. An example of unsteady gradually varied flow is, flood that changing the discharge and flow depth from section to another. Flood routing done by mathematical methods helping the designers to understand the implications of the river and its surroundings area. Can be point to the important applications calculating spillways dimension in different kinds of dams, flood forecasting, determining rivers frontage, evaluating flood control systems, calculating levees height, urbanizing and estimating protection features for buildings that are exposed to flooding, flood routing are divided to hydrological and hydraulically methods . In the hydrological routing, using only one-dimension of continuity equation and the momentum equation is neglected while in calculations are entered both equations of continuity and momentum in the hydraulic routing. Include hydrological methods that are widely used in the flood routing is Muskingum method. In this technique inflow will be considered as a factor on the slope of water surface and thus, amount of storage and the outlet have affects on slightly range so in this way used, of two equations of continuity and storage. Hence, is required know the inflow and outflow samples from the corresponding, and can flood routing another flow. To realizing this need, the parameters (X and k) to be determined properly in linear Muskingum equation coefficient. In the present study, various techniques to estimate the parameters for Muskingum method are taken into consideration with two different data sets Bvanlu River. Also the parameters have been estimated with the help of software, HEC-HMS.

2. DESCRIPTION OF METHODS

Method principles Muskingum

Theme thud by Mc Carty, a group of U.S Army Corps of Engineers (US Army), for flood control projects in the Muskingum River Ohio State, was provided. Muskingum method is based on the continuity equation, the equation is as follows:

$$\frac{1}{\Delta t}(S_j - S_{j-1}) = \frac{1}{2}(I_j + I_{j-1}) - \frac{1}{2}(O_j + O_{j-1})$$