SENSITIVITY ANAYSIS OF HEC-RAS MODEL

By

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Abstract

Recently, the number of researches who interested in water resources knowledge shows an increment such as in water supply, irrigation, flood mitigation and water quality control. Science and technology are applied in their research for the reason of economical and efficient design, operation and maintenance in various projects. Development in computer technology and numerical methods of solution has lead to the rising interest in applying the modeling for surface water hydrology. The difficulty to get the hydrologic data and shortage of its record is the main factors, which encourage researchers to use the numerical models as a device in flood studies. In the present study, numerous programs are available to solved flooding problems such as HEC-RAS, MIKE 11, ISIS and DIVAST. In this research, River Analysis System program, which was developed by the Hydrologic Engineering Center (HEC-RAS), are used in order to verify the capability of HEC-RAS to quantify flood level problems under various hydraulics conditions. This was done using sensitivity analysis of the HEC-RAS model based on four parameters selected. Parameter that is being tested was the bed slope of the channel, storm period, peak discharge and Manning's coefficient. The study tried to simulate the behavior of the flow when changes are made in the parameter of the idealized channel. Simulation procedures were done through unsteady flow analysis of idealized channel in the idealized condition in a mean to evaluate the effect of uncertainties in the flow.

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CHAPTER 1
INTRODUCTION

1.1 General

Global climate change induced by increases in greenhouse gas concentrations is likely to increase temperatures, change precipitation patterns and probably raise the frequency of extreme events [IPCC, 2001]. This may have serious impacts to our society, especially through an increased occurrence of flooding events. In a way to solve for this problem, it is require using modeling approaches that can incorporate knowledge from a broad range of scientific disciplines. Selection of a model to tackle the problems is not an easy task especially there are large number of available models and the potentially wide range of study objectives, data constraints, and spatial and temporal scales of application nowadays. Coupled with these problems are the problems of study area characterization once the model is selected. Guidelines for parameter estimation are normally few and the user commonly has to make decisions based on an incomplete understanding of the model developer's intent.

The purpose of modeling is to represent as accurately as necessary a system of interest. A system is typically comprised of many components. All modeling involves decisions regarding aggregation and exclusion. Aggregation refers to simplified representation of complex real world systems (Cullen and Frey, 1999). Models are developed for different purposes, often with different decision-making objectives in mind.