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Synthetic Unit Hydrograph – Importance and Uses

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Abstract

This synopsis is made to realize the importance of Synthetic Unit Hydrograph and also the necessities of such a thing even after already having a hydrograph. The main aim is to understand the various techniques needed for establishing a relationship between the basin characteristics and the unit graph characteristics, for a unit rainfall of an ungauged basin; wherein the Synthetic Unit hydrograph theory is of utmost importance. Our goal is to study Snyder's theory (1938) for Synthetic Unit hydrograph in detail, based on a study of a large number of catchment basins in the Appalachian Highlands of Eastern United States, developed a set of empirical equations, connecting the basin characteristics with the unit graph characteristics; thereby ultimately develop a synthetic unit hydrograph on our own at the end of the project. The synopsis also includes the analysis of three hydrograph characteristics which Snyder found relationships between; those are effective rainfall duration(t_r), the peak direct runoff rate(q_p) and the basin lag time(t_l). Synopsis is mentioned about our way of approach and also the purpose of simulation of basin diffusion by estimating the basin lag based on a certain formula or procedure.

Keywords: Synthetic Unit hydrograph • Effective rainfall duration • peak direct runoff rate • basin lag time.

Introduction

We have aimed at a very methodical approach of doing the synopsis. Firstly, we have gone through the entire process of Computing runoff from a Given rainfall and taken notes from it. Thereafter, we studied the characteristics of both gauged basins and ungauged basins and thereby, ultimately came by Snyder's Method for Synthetic Unit Hydrograph. We discussed the relations and empirical formulae derived by Snyder regarding ungauged catchment basin characteristics. After the US equations, we further researched deep down into Indian Equations recommended by The Central Water Commission for which we took the reference from two different books. After going through all the relations and taking into account design purposes, we finally added the relation between Discharge vs Time in the form of a graph displaying Synthetic Unit Hydrograph.

Bibliography: Hydrology and water Resources Engineering by Santosh Kumar Garg and Applied Hydrology by Ven Te Chow.