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滯洪池洪水歷線演算模式之建立與驗證

- 以矩形孔口式出流口為例

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摘　　要　本研究建立滯洪池數值演算模式，並以試驗驗證數值模式。試驗配置採長頸渠道及斜坡以模擬滯洪池入流口、寬廣渠道模擬滯洪池及矩形孔口模擬滯洪池出流口，並分成定量與變量流試驗，定量流試驗搭配流量公式可求得滯洪池入流口及出流口之水位與流量關係，變量流試驗則模擬出短延時之近似三角形入流歷線。數值模式以水文連續方程式及 Runge-Kutta 數值方法爲基礎，模式輸入之入流歷線採用變量流試驗所量測之入流歷線，而出流口流量公式則採用定量流試驗所推得之孔口流量公式。試驗結果顯示定量流試驗下之長頸渠道入流口及孔口式出流口流量係數公式與試驗值誤差大多在 5%以內，變量流試驗之出流歷線與數值計算結果吻合，顯示所建立之數值模式適用於滯洪池水理計算，值得加以推廣應用。

關鍵詞：滯洪池、連續方程式、短延時暴雨。

The Establishment and Verification of Runoff Hydrograph Routing Model for Detention Pond - A Case Study with Rectangular Slots as the Outflow Device

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ABSTRACT　This study establishes a numerical model of detention pond, and verifies the model using a series of experiments. The experiment uses a long-throat channel and a slope to simulate the entrance of detention pond, a wide channel as the detention pond, and a rectangular slot as the exit of detention pond. The experiments can be divided into the steady flow and the unsteady flow. Combining the steady flow experiment and the discharge equation can establish the relationship between the water level of entrance/exit of detention pond and the discharge. The unsteady flow experiment develops a hydrograph similar to the triangular hydrograph of short duration time. The numerical model is based on the hydrologic continuity equation and the Runge-Kutta numerical method. The inflow hydrograph of unsteady flow is used to be the inflow

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hydrograph of numerical model. The discharge equation of rectangular slot developing by the steady flow experiment is used in the numerical model. The steady flow experiment outlines that most of the discharge coefficient differences of long-throat channel and the rectangular slot, between the equation and the data, are smaller than 5%. The outflow hydrograph of unsteady flow developing by numerical model has a good match with the experimental hydrograph. It informs that the numerical model can be used in the hydrological routing of detention pond.

Key Words: detention pond, continuity equation, short duration rainfall.