



# **Sensitivity Analysis and Calibration of a Rainfall-Runoff Model with the Combined Use of EPA-SWMM and Genetic Algorithm**

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## **A b s t r a c t**

An integrated Visual Basic Application interface is described that allows for sensitivity analysis, calibration and routing of hydraulic-hydrological models. The routine consists in the combination of three freeware tools performing hydrological modelling, hydraulic modelling and calibration. With such an approach, calibration is made possible even if information about sewers geometrical features is incomplete. Model parameters involve storage coefficient, time of concentration, runoff coefficient, initial abstraction and Manning coefficient; literature formulas are considered and manipulated to obtain novel expressions and variation ranges. A sensitivity analysis with a local method is performed to obtain information about collinearity among parameters and a ranking of influence. The least important parameters are given a fixed value, and for the remaining ones calibration is performed by means of a genetic algorithm implemented in GANetXL. Single-event calibration is performed with a selection of six rainfall events, which are chosen so to avoid non-uniform rainfall distribution; results are then successfully validated with a sequence of four events.

**Key words:** calibration, genetic algorithm, identification analysis, rainfall-runoff model, sensitivity analysis.