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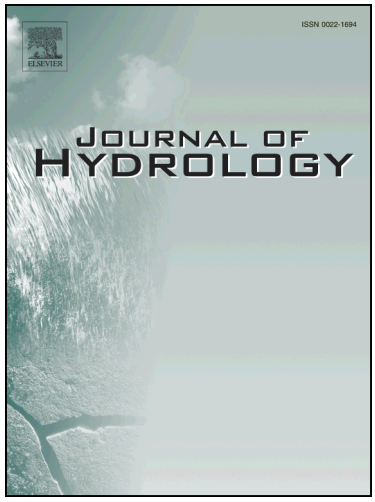

Research papers

Model Predictive Control for Optimising the Operation of Urban Drainage Systems

Yves Abou Rjeily, Oras Abbas, Marwan Sadek, Isam Shahrour, Fadi Hage Chehade

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Model Predictive Control for Optimising the Operation of Urban Drainage Systems

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Abstract

This work presents a methodology for developing a Model Predictive Control (MPC) for enhancing the operation of Urban Drainage Systems (UDS). The objective of the MPC is to apply a proactive management strategy that uses optimised time-state schedules for operating the actuators of UDS in real time. Aiming to mitigate flooding consequences, the MPC uses EPA-SWMM hydrologic-hydraulic simulation engine and Genetic Algorithm (GA) to optimise the time-state schedules for the actuators of UDS. The efficiency of the MPC was tested on the Lille University Campus, resulting in satisfying improvements in the use of storage capacity of retention elements within the UDS.

Keywords

Floods Mitigation; Genetic Algorithm; Model Predictive Control; Proactive Management Strategy; Urban Drainage Systems

Abbreviations

MPC: Model Predictive Control

UDS: Urban Drainage System

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