Environmental Engineering and Management Journal *August 2019, Vol. 18, No. 8, 1657-1670*
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

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WWTP MODEL CALIBRATION BASED ON DIFFERENT OPTIMIZATION APPROACHES

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Abstract

There is a significant interest in modelling the wastewater treatment plants (WWTP) because with a calibrated model a large variety of operational strategies can be evaluated, the control system design may be improved and enhanced constructive alternatives may be proposed. The Activated Sludge Model No. 1 (ASM1) has the potential of describing the biochemical processes taking place in WWTPs, in association with the Benchmark Simulation Model No. 1 (BSM1) which adds the description of the involved physical processes. An important challenge for reliable simulators development is the dynamically changing composition of the influent wastewater, also varying from one WWTP to another. Due to this reason, it is necessary to fit the model for each WWTP. This paper proposes a new methodology for the dynamic simulator calibration of a municipal WWTP. Different optimization methods are used for the simulator calibration and results of the different approaches are comparatively presented. Based on WWTP measurements a set of influent variables, bioreactor parameters and settler parameters are calibrated. Optimization was carried out based on classical, genetic, hybrid and Pareto multiobjective algorithms and their performance is discussed, revealing their strengths and limitations.

Key words: activated sludge model no. 1, model calibration, optimization methods, wastewater treatment

Received: July, 2018; Revised final: May, 2019; Accepted: June, 2019; Published in final edited form: August, 2019

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