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Mathematical Modeling of Activated Sludge Process: Identification and Optimization of Key Design Parameters

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Abstract : There are some important design parameters of activated sludge process (ASP) for wastewater treatment and they must be optimally defined to have the optimized plant working. To know them, developing a mathematical model is a way out as it is nearly commensurate the real world works. In this study, a mathematical model was developed for ASP, solved under activated sludge model no 1 (ASM 1) conditions and MATLAB tool was used to solve the mathematical equations. For its real-life validation, the developed model was tested for the inputs from the municipal wastewater treatment plant and the results were quite promising. Additionally, the most cardinal assumptions required to design the treatment plant are discussed in this paper. With the need for computerization and digitalization surging in every aspect of engineering, this mathematical model developed might prove to be a boon to many biological wastewater treatment plants as now they can in no time know the design parameters which are required for a particular type of wastewater treatment.

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