

A REDUCED MODEL AND SIMULATIONS OF REACTIVE SETTLING OF ACTIVATED SLUDGE

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ABSTRACT. A mathematical model for the simulation of batch settling of activated sludge with reactions is presented. The model is given by concentration equations for the activated and inert microorganisms, and the sum of these produces an equation that can be expressed as a convection-diffusion PDE. These equations were previously studied in a model for the sedimentation process of the secondary clarifier in wastewater treatment plants [1]. Sedimentation is often modeled under the assumption that no reaction takes place. However, there is an interest to model and simulate reactive settling, for example, in sequencing batch reactors (SBRs) [2, 3, 4]. Hence, it is the purpose of this contribution to make a first step towards extending the advances made by Bürger et al. [1]. The numerical solution is presented by a difference scheme, using different approaches: the Godunov and Engquist-Osher numerical flux functions. Simulations for different scenarios and efficiency investigations for different approximations of the numerical fluxes are presented.

Keywords: Batch sedimentation, numerical scheme, degenerate parabolic PDE, sequencing batch reactor

Mathematics Subject Classifications (2010): 35B37, 35L65, 93A30

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