ON TIME DISCRETIZATIONS FOR THE SIMULATION OF THE BATCH SETTLING-COMPRESSION PROCESS IN ONE DIMENSION

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ABSTRACT. The simulation model for secondary settling tanks by Bürger et al. (2013) was introduced mainly to resolve spatial discretization problems when both hindered settling and the phenomena of compression and dispersion are included. Straightforward time integration unfortunately means long computational times. The next step in the development is to introduce and investigate time-integration methods for more efficient simulations, but where other aspects such as implementation complexity and robustness are equally considered. This is done for batch settling simulations. The key findings are partly a new time-discretization method and partly its comparison with other specially-tailored and standard methods. Several advantages and disadvantages for each method are given. One conclusion is that the new linearly implicit method is easier to implement than another one (semi-implicit method), but less efficient based on two types of batch sedimentation tests.

This presentation is based on [3].

Keywords: benchmark simulation; Bürger-Diehl simulation model; clarifier; compressive settling; linearly implicit time integration; numerical efficiency

Mathematics Subject Classifications (2010): 35K65, 35L65, 35Q35, 35Q70, 65M20

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