



SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Expositor:

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Título de la Charla:

A method-of-lines formulation for a model of reactive settling in tanks with varying cross-sectional area

Fecha y Hora:

Martes 24 de Noviembre de 2020, 15:30 Horas.

Lugar:

Seminario online

Plataforma Zoom

Resumen

A spatially one-dimensional model of reactive settling in an Secondary Settling Tank is formulated by combining a mechanistic model of sedimentation with compression with a model of biokinetic reactions. The final model is a system of strongly degenerate parabolic, nonlinear partial differential equations (PDEs) that include discontinuous coefficients to describe the feed, underflow and overflow mechanisms, as well as singular source terms that model the feed mechanism. A finite difference scheme for the final model is derived by first deriving a method-of-lines formulation (discrete in space, continuous in time), and then passing to a fully discrete scheme by a time discretization. The main mathematical result is an invariant-region property, which implies that physically relevant numerical solutions are produced. Simulations of denitrification in SSTs in wastewater treatment illustrate the model and its discretization.