
LA SERENA NUMÉRICA I

Sexto Encuentro de Análisis Numérico de Ecuaciones Diferenciales Parciales

Departamento de Matemáticas, Universidad de La Serena, Diciembre 14–16, 2011

A clarifier-thickener model including flocculant transport and adsorption

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Abstract

We consider a one-dimensional system of conservation laws modeling clarifier-thickener units for flocculated suspensions. The novelty of this model is included in the process of settling two equations that model the transport and adsorption of the flocculant in the mixture. Additionally, we also have a reactive term on the right hand side of the adsorption and transport equations. For us this term describes the adsorption (and desorption) of the flocculant in the mixture. We consider that the adsorbed flocculant appears as a parameter in the nonlinear functions describing the solid-fluid relative velocity, then the available and adsorbed flocculant are not just scalars that travel with the fluid and the solid. A numerical algorithm for the solution of this system is presented along with numerical examples.

Key words: Conservation law, Discontinuous flux, Clarifier-thickener, Sedimentation.

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