Congress on Numerical Methods in Engineering
Lisboa, June 29 to July 02, 2015

RESUMO N° 325

NUMERICAL ANALYSIS OF A DYNAMIC PROBLEM INVOLVING BULK-SURFACE SURFACTANTS

Jose R. Fernandez, jose.fernandez@uvigo.es
University of Vigo, Spain

Cristina Núñez García, cristina.nunez.garcia@usc.es
University of Santiago de Compostela, Spain

Keywords: Adsorption Dynamic Model, Surfactants, Langmuir Isotherm, A Priori Error Estimates

Here, we numerically study a dynamic problem which models the evolution of the concentration of surfactants, including the effects of the diffusion and the surface diffusion. A kinetic expression which can be reduced to the well-known Langmuir-Hinshelwood equation is used to model the relation between the surfactant concentration and the surface concentration. The variational formulation is written as a coupled system of parabolic elliptic partial differential equations, for which an existence and uniqueness result is recalled. Then, fully discrete approximations

are introduced by using the classical finite element method to approximate the spatial variable and the implicit Euler scheme to discretize the time derivatives. An a priori error estimates result is shown, from which the linear convergence of the approximation is derived under suitable additional regularity conditions.