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Mathematical modeling and numerical simulation of the biodenitrification process

Communication Info

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Abstract

In this talk, we propose and study a new mathematical model dedicated to describing the dynamics of the biodenitrification process, integrating both biological and mechanical mechanisms as well as the phenomenon of chemotaxis [1,2,3]. The model is based on a nonlinear system of reaction–diffusion–advection equations describing bacterial activity, coupled with Darcy-type flow in a porous medium. We establish results on the existence and uniqueness of solutions, and then perform a numerical approximation of the model within a variational framework. Finally, we introduce a complete discrete scheme based on the finite element method and present numerical simulations in two and three dimensions.

References

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