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Fast reaction limit of a three-component reaction-diffusion system

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Abstract

We consider a three-component reaction-diffusion system with a reaction rate parameter. Its singular limit as the reaction rate tends to infinity is investigated. The limit problem is given by a free boundary problem which possesses three regions separated by the free boundaries. Only one component vanishes and the other two are positive in each region. Therefore, the dynamics is governed by a system of two equations there.

Keywords: reaction-diffusion system, fast reaction limit, reaction limit set, free boundary problem, nonlinear diffusion problem

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