

**GLOBAL EXISTENCE FOR REACTION-DIFFUSION SYSTEMS
MODELING IONS ELECTRO-MIGRATION
THROUGH BIOLOGICAL MEMBRANES
WITH MASS CONTROL
AND CRITICAL GROWTH
WITH RESPECT TO THE GRADIENT**

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ABSTRACT. This paper studies the existence of global weak solutions for reaction-diffusion systems depending on two main assumptions: the non-negativity of solutions and the total mass of components are preserved with time, the non-linearities have critical growth with respect to the gradient. This work is a generalization of the work developed by Alaa and Lefraich [2] without the presence of the gradient in the kinetic reaction terms.

1. Introduction

Some classes of models of ions migration through biological membranes are studied by Alaa and Lefraich [2]. Such migrations take place for most living cells and biochemical processes. As the motion of ions is due to diffusion and the electrical field, and they undergo reactions, the ions concentrations satisfy the Nernst–Planck equations, including kinetic reaction terms in the general form and the potential is given by Poisson equation. The equations of that model can

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