

Finite Element Analysis For a Reaction Diffusion System Describing Calcium Dynamics in a Cardiac Cell

Mostafa BENDAHMANE, INRIA-Carmen Bordeaux Sud-Ouest

Elmahdi ERRAJI, Equipe M2SC Cadi Ayyad Ecole Supérieur de Technologie

Fahd KARAMI, Equipe M2SC Cadi Ayyad Ecole Supérieur de Technologie

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The Calcium Induced-Calcium Release (CICR) process has traditionally modeled using a linear reaction diffusion model. To describe the calcium's wave propagation in cardiac cell, previous researches had considered the Fickian law with a constant diffusion rate. Due to cell's medium complexity, we examine a non linear mathematical model describing the calciums dynamics in bi-domain. First, we present the highlights on the existence and uniqueness result. Then, we approximate the solution by Galerkin projection using finite element method. By refining the discretization parameters, we prove the convergence of the approximated solution to the weak one. Finally we present 3D numerical simulation of calciums dynamics in cardiac cell showing the difference between linear and non linear case.

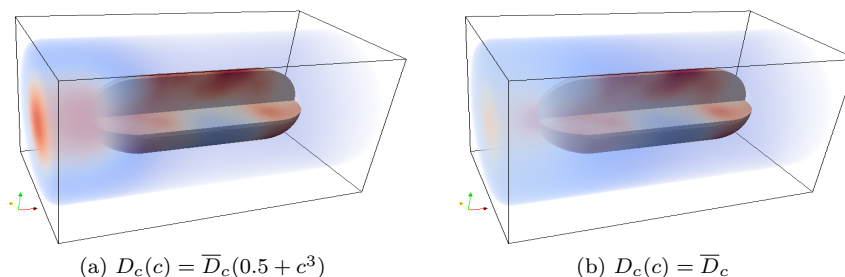


Figure 1: This figure represents the 3D distribution of calcium in both domain for $t=30$

Références

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Elmahdi ERRAJI, Equipe M2SC Cadi Ayyad Ecole Supérieur de Technologie BP. 383, Essaouira. Maroc
erraji0elmahdi@gmail.com

Mostafa BENDAHMANE, Institut de mathématique de Bordeaux (IMB) et l'Institut de Rythmologie et Modélisation Cardiaque (Liryce), université de Bordeaux et INRIA-Carmen Bordeaux Sud-Ouest
mostafab@math.uio.no

Fahd KARAMI, Equipe M2SC Cadi Ayyad Ecole Supérieur de Technologie BP. 383, Essaouira. Maroc
fa.karami@uca.ma