



SEMINARIO DE ANÁLISIS NUMÉRICO DE ECUACIONES DIFERENCIALES PARCIALES.

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Título de la Charla:

***Numerical analysis of a finite element method for an
optimal control of bidomain-bath model***

Fecha y Hora:

Martes 8 de Marzo de 2016, 15:30 Horas.

Lugar:

Sala Seminario, Facultad de Ciencias, Universidad del Bío-Bío, Concepción.

Resumen

This talk is concerned with the study of the convergence analysis for an optimal control of bidomain-bath model by using the finite element scheme. The bidomain-bath model equations describe the cardiac bioelectric activity at the tissue and bath volumes where the control acts at the boundary of the tissue domain. We establish the existence of the finite element scheme, and convergence of the unique weak solution of the direct bidomain-bath model. The convergence proof is based on deriving a series of a priori estimates and using a general L^2 -compactness criterion. Moreover, the well-posedness of the adjoint problem and the first order necessary optimality conditions are shown. Comparing to the direct problem, the convergence proof of the adjoint problem is based on using a general L^1 -compactness criterion. The numerical tests are demonstrated which achieve the successful cardiac defibrillation by utilizing less total current. Finally, the robustness of the Newton optimization algorithm is presented for different finer mesh geometries.

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