

A VIRTUAL ELEMENT METHOD FOR A NONLOCAL FITZHUGH–NAGUMO MODEL OF CARDIAC ELECTROPHYSIOLOGY

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ABSTRACT. We present a Virtual Element Method (VEM) for a nonlocal reaction-diffusion system of the cardiac electric field. To this system, we analyze an H^1 -conforming discretization by means of VEM which can make use of general polygonal meshes. Under standard assumptions on the computational domain, we establish the convergence of the discrete solution by considering a series of a priori estimates and by using a general L^p compactness criterion. Moreover, we obtain optimal order space-time error estimates in the L^2 norm. Finally, we report some numerical tests supporting the theoretical results.

Keywords: Virtual element method, FitzHugh–Nagumo equations, Convergence, Error estimates.

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