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Mathematical Modelling Of Cardiac Electrical

Bidomain model is one of the two differential equation based models for cardiac electrical activity. The model is considered as the mathematical equations that have been used for simulating cardiac electrophysiological waves for years taking into account the non-linear dynamic nature of the cardiac signal and giving realistic simulation.

Mathematical Modelling of Cardiac Electrical Activity ...

In recent times, mathematical model of cardiac electrical activity has been recognized as one of the significant approaches capable of revealing diagnostic information about the heart.

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However, an efficient and accurate mathematical technique required for this modelling is one of the major problems in the field of biomedical research.

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Guevara M.R. (1991) Mathematical Modeling of the Electrical Activity of Cardiac Cells. In: Glass L., Hunter P., McCulloch A. (eds) Theory of Heart. Institute for Nonlinear Science.

Mathematical Modeling of the Electrical Activity of ...

Mathematical modeling of heart provides a better understanding for the complex biophysical phenomena related to electrical activity in the heart. Various electrophysical models have - been developed to simulate electrical properties of cardiac tissue. In this research work monodomain model which is coupled with the single cell FitzHugh-Nagumo model is used to simulation the electrical activities.

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1 INTRODUCTION IJSER

The achievements of modern science, in particular - biology, biophysics and cybernetics, provide great opportunities to solve this problem through the development of mathematical models of cardiac electrical activity. The purpose of this article is to review the heart electrophysiology and the main approaches to the modeling of cardiac electrical activity as well as specific models. Nowadays, due to the prevalence of cardiovascular diseases there is extremely high demand not only in the ...

Mathematical Modeling the Electrical Activity of the Heart

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Mathematical modelling itself imposes tremendous challenges, due to the amazing complexity of the cardiocirculatory system, the multiscale nature of the physiological processes involved, and the need to devise computational methods that are stable,

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reliable and efficient.

The cardiovascular system: Mathematical modelling ...

MATHEMATICAL MODELING OF DC CARDIAC ABLATION SOWMYA REDDY NARALA ABSTRACT This thesis presents a mathematical modeling of the cardiac DC ablation procedure. The model treats the procedure as a one dimensional heat transfer phenomenon taking place across the thickness of the myocardium. The model further

Mathematical Modeling of DC Cardiac Ablation

Mathematical models have been widely used in the simulation of cardiovascular systems. The human cardiovascular system is highly complex and involves many control mechanisms. The model of Windkessel is a famous example of such a discrete model.

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Mathematical Modelling of Human Heart as a ...

Mathematical models of cardiac electrophysiology have made a tremendous progress since the first numerical ECG simulations in the 1960s.

Mathematical Modeling and Simulation of Ventricular ...

The combination of computational models and biophysical simulations can help to interpret an array of experimental data and contribute to the understanding, diagnosis and treatment of complex diseases such as cardiac arrhythmias. For this reason, three-dimensional (3D) cardiac computational modelling is currently a rising field of research.

Three-dimensional cardiac computational modelling: methods ...

mathematical modelling [2,15-19]. To the best of our knowledge, the blood flow in CA during abnormal heart rhythms

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is rarely studied in clinics and by mathematical modelling. In this work, we present a modification of the previously developed one-dimensional (1D) mathematical model of

Computational Analysis of Coronary Blood Flow: The Role of ...

Physical models are suitable to simulate real physiological data based on proper experimental set up present. This paper introduces a new mathematical modelling of human heart as a...

(PDF) Mathematical modelling of human heart as a ...

Due to the extreme complexity of cardiac tissue and its intrinsic nonlinear dynamics, mathematical and computational modelling played (and continue to play) a crucial role in unveiling multiscale emerging phenomena and explaining both regular, and irregular behaviour, up to the description of life-threatening arrhythmias and fibrillation patterns.

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Effective mathematical modelling of fractional-diffusion

...

Physical models are suitable to simulate real physiological data based on proper experimental set up present. This paper introduces a new mathematical modelling of human heart as a hydroelectromechanical system (HEMS). This paper simulates the human heart based on three main functions: hydraulic, electrical and mechanical parameters.

Mathematical modelling of human heart as a ...

cardiac electrical activation, and other cardiac field modeling problems. finite element model; ventricular geometry; myocardial fiber orientation A MATHEMATICAL MODEL of cardiac architecture, which provides realistic descriptions of both the geometry of left and right ventricles and the organization of muscle

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Mathematical model of geometry and fibrous structure of

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Mathematically Modelling the Electrical Activity of the Heart

A model begins with a mathematical description of electrical events at the cellular level that give rise to cardiac action potentials. In particular, models incorporate formulations of transmembrane ionic currents along with the voltage, ionic concentrations, and ion channel kinetics responsible for the currents.

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Models of cardiac cell - Scholarpedia

This book on modelling the electrical activity of the heart is an attempt to describe continuum based modelling of cardiac electrical activity from the cell level to the body surface (the forward problem), and back again (the inverse problem).

Mathematically Modelling the Electrical Activity of the ...

Professor David Gavaghan on mathematical models of the heart, and making them work better to allow for predictions of heart function Based on work funded by the EPSRC.

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