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This work presents mathematical modelling of cardiac electrical activity using bidomain approach with the main focus on cardiac action potential, an important basic electrical property of the heart. 1.1 Bidomain Model Bidomain model is one of the two differential equation based models for cardiac electrical activity.

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J. ELECTROCARDIOLOGY 20 (3),
1987, 219-226 Mathematical
Modeling of Electrical
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Electrical Activity
ROBERT PLONSEY, PH.D. AND
ROGER C. BARR, PH.D. SUMMARY

This paper reviews the literature on mathematical models of cardiac activation and evaluates these approaches against an analytical approach that includes both structure and membrane properties.

~~Mathematical modeling of
electrical activity of the
heart...~~

Abstract. We introduce the Hodgkin-Huxley (HH) formulation describing the flow of ionic currents across the membrane of a cardiac cell, paying particular attention to the central concepts of

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~~Electrical Activity~~
activation and inactivation. We indicate a few situations in which HH-type modeling of cardiac cells has been useful, and show that continuous models of the HH-type break down when one observes phenomena in which single-channel behavior becomes important.

~~Mathematical Modeling of the
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Mathematical and numerical modelling of the cardiovascular system is a research topic that has attracted remarkable interest from the mathematical community because of its intrinsic mathematical difficulty and

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the increasing impact of cardiovascular diseases worldwide.

~~The cardiovascular system:
Mathematical modelling ...~~
Early development of ionic models for cardiac myocytes, from the pioneering modification of the Hodgkin-Huxley giant squid axon model by Noble to the iconic DiFrancesco-Noble model integrating voltage-gated ionic currents, ion pumps and exchangers, Ca^{2+} sequestration and Ca^{2+} -induced Ca^{2+} release, provided a general description for a mammalian Purkinje fibre (PF) and the framework for modern cardiac

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~~Electrical Activity~~
models. In the past two decades, development has focused on tissue-specific models ...

~~Mathematical models of the electrical action potential of ...~~

Abstract: Different electrical models of human heart, partial or complete, with linear or nonlinear models have been developed. In the literature, there are some applications of mathematical and physical analog models of total artificial heart (TAH), a baroreceptor model, a state-space model, an electromechanical biventricular model of the

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heart, and a mathematical model for the artificial generation of electrocardiogram (ECG) signals.

~~Mathematical modelling of human heart as a ...~~

Pašek et al. consider the role of cardiac T-tubules in the physiological modulation of electrical and contractile activity through development of a mathematical model of ventricular cardiomyocytes in which the cardiac transverse axial tubular system is described as a single compartment, allowing them to demonstrate the effects of this system on

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Ca²⁺ and K⁺ Handling (Pašek et al. 2006).

~~Mathematical models in physiology — People~~
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.

~~Mathematical Modelling of Human Heart as a ...~~
do mathematical modeling and simulation (with Scilab and Xcos) for a RRLC circuit (page 6) Electrical voltage

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~~Electrical Activity~~
and current The electrical voltage (or potential difference) u_{BA} [V] between two points B and A, is defined as the work which would be done (or the energy required) in carrying a unit positive charge from one point to the other.

~~Mathematical models and simulation of electrical systems ...~~

Action potential, electrical activity of the heart, cardiac electrophysiology models, Landau-Ginzburg model, Hodgkin-Huxley model, Luo-Rudy model Abstract
Nowadays, due to the prevalence of cardiovascular diseases there is extremely

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~~Electrical Activity~~ high demand not only in the development of new means of treatment and diagnosis, but also in their wider implementation in practice.

~~Mathematical Modeling the
Electrical Activity of the
Heart ...~~

Due to its complexity and importance, cardiac mechanics has been studied extensively both experimentally and through mathematical models and simulation. Models of cardiac mechanics evolved from seminal studies in skeletal muscle, and developed into cardiac specific, species specific, human specific and finally

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patient specific
calculations.

~~A short history of the
development of mathematical
models ...~~

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

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~~1 INTRODUCTION IJSER~~

This mathematical modelling of cardiac electrical activity, as one of the most operational sellers here will agreed be in the midst of the best options to review. AvaxHome is a pretty simple site that provides access to tons of free eBooks online under different categories. It is believed to be one of the major non-torrent file sharing sites ...

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For models aimed at EP
computational simulation,

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once the anatomy and structure of the heart have been defined, a mathematical model that simulates the EP behaviour of the myocardium must be plugged in. Figure 9 briefly summarises the main methods and options to model the cardiac EP using EP models.

~~Three-dimensional cardiac computational modelling: methods ...~~

Example of mathematical modelling of electrical system for series RLC circuit.

~~Mathematical Modelling of Electrical System - YouTube~~
Due to the extreme

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~~Electrical Activity~~
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.

~~Effective mathematical modelling of fractional diffusion ...~~

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~~Mathematically Modelling the Electrical Activity of the Heart~~

All mathematical models of cardiac cellular electrophysiology are based, at least in part, on the seminal electrophysiological work of Hodgkin and Huxley in the giant squid axon , which quantified the ionic mechanisms underlying the neuronal AP. Based on their work, the cellular AP can be conceptualized as a momentary, active change in the transmembrane electrical potential (the difference

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between intracellular and extracellular electrical potentials) of an excitable membrane that occurs ...

~~Frontiers | Mathematical models of cardiac pacemaking~~
...

Mathematical modelling of drug-ion channel interactions for cardiac safety assessment Abstract: Unintended drug interactions with ion channels in cardiac cells can alter normal electrical activity in the heart.

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