



Biophysical Aspects of Coherence and Biological Order

By Jiri Pokorny

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Abstract—The biophysical aspects of the effects of ultrasound on biological tissues are considered. A mathematical model that describes the effects of the primary interaction of mechanical vibrations of a resilient medium (therapeutic ultrasound in the frequency range of 800–3000 kHz) with biological tissues, was developed. The model is represented by a system of three ordinary differential equations of the first order that describe the dependence of the rate of temperature change in biological tissue exposed to ultrasound and the concentration of live cells on the intensity of ultrasonic radiation. Fluorescence spectroscopy has traditionally found wide application in biochemistry and cell biology. Since there are relatively few naturally occurring fluorescent biomolecules, fluorescence spectroscopy offers a combination of great specificity and sensitivity. Historically, these features have been exploited with great success utilizing both intrinsic and extrinsic probes. Recent applications have built upon these traditional strengths and have resulted in the development of new instrumental techniques, novel and convenient fluorescent probes, and a deeper, theoretical understanding of biological organisms are complex open dissipative systems whose dynamical stability is sustained due to the exchange of matter, energy and information. Dynamical stability occurs through a number of mechanisms that sustain efficient adaptive dynamics. The biophysical aspects of solitons were adequately reviewed by Foletti and Brizhik [64] showing that in cells Solitons are seen as localized, non-dispersive excitations, which exist in many nonlinear systems [65] [66] and have been proposed to act as an organizing principle in the process of protein folding [67], including membrane proteins [68]. It allows intra- and intercellular communication and long-range coherence in the system.

Many biological and neural systems can be seen as networks of interacting periodic processes. Importantly, their functionality, i.e., whether these networks can perform their function or not, depends on the emerging collective dynamics of the network. In fact, this review is intended to have aspects of a tutorial and to provide an introduction to the Ott–Antonsen and Watanabe–Strogatz reductions as exact mean-field reductions and outlining what type of questions they have been instrumental in answering: We include three explicit examples how these mean-field reductions can be helpful in giving insights into the collective dynamics of. The order parameter Z is an observable which encodes the state of the system, and should not be confused with a system parameter. a) b). Biological phenomena, like many others, show aspects and relations susceptible of physical analysis and interpretation. It is by the choice of problems and by the intellectual processes with which they are formulated and attacked, more than by the particular techniques employed, that a subject can be most clearly defined. Biology, which may be viewed as a general subject pervading biophysical study, is evolving from a purely descriptive science into a discipline increasingly devoted to understanding the nature of the prime movers of biological events. Important aspects of biophysics have been derived from physiology, especially in studies involving the conduction of nerve impulses. Handbook of biological effects of electromagnetic fields. Third edition. Biological and Medical Aspects of Electromagnetic Fields. © 2006 by Taylor & Francis Group, LLC. © 2006 by Taylor & Francis Group, LLC. Handbook of biological effects of electromagnetic fields. from a 60-Hz system are exposed to nonradiating field components, which are orders of magnitude larger than the part of the field that contributes to radiation. A living organism exposed to a static (dc) field or to a nonradiating near field may. *BBA: Bioengineering and Biophysical Aspects of Electromagnetic Fields (ISBN 0-8493-9539-9); BMA: Biological and Medical Aspects of Electromagnetic Fields (ISBN 0-8493-9538-0). © 2006 by Taylor & Francis Group, LLC. Biological order in all living creatures is a fascinating phenomenon. Biochemical reactions and biophysical processes including enormous amount of various entities and structures are coordinated in space and time resulting in highly organized dynamic system with self control. The book consists of analysis of biophysical mechanism of long range interactions based on polar v Biological order in all living creatures is a fascinating phenomenon. Biochemical reactions and biophysical processes including enormous amount of various entities and structures are coordinated in space and time resulting i... Start your review of Biophysical Aspects of Coherence and Biological Order. Write a review. No matching reviews.

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