

Modeling Phase Transitions in the Brain [

Steyn-Ross, D. Alistair

Springer New York, 2010

Monografía

Foreword by Walter J. Freeman. The induction of unconsciousness using anesthetic drugs demonstrates that the cerebral cortex can operate in two very different modes: alert and responsive versus unaware and quiescent. But the states of wakefulness and sleep are not single-neuron properties---they emerge as bulk properties of cooperating populations of neurons, with the switchover between states being similar to the physical change of phase observed when water freezes or ice melts. Some brain-state transitions, such as sleep cycling, anesthetic induction, epileptic seizure, are obvious and detected readily with a few EEG electrodes; others, such as the emergence of gamma rhythms during cognition, or the ultra-slow BOLD rhythms of relaxed free-association, are much more subtle. The unifying theme of this book is the notion that all of these bulk changes in brain behavior can be treated as phase transitions between distinct brain states. "Modeling Phase Transitions in the Brain" contains chapter contributions from leading researchers who apply state-space methods, network models, and biophysically-motivated continuum approaches to investigate a range of neuroscientifically relevant problems that include analysis of nonstationary EEG time-series; network topologies that limit epileptic spreading; saddle--node bifurcations for anesthesia, sleep-cycling, and the wake--sleep switch; prediction of dynamical and noise-induced spatiotemporal instabilities underlying BOLD, alpha-, and gammaband EEG oscillations, gap-junction-moderated Turing structures, and Hopf--Turing interactions leading to cortical waves. Written for: Researchers, clinicians, physicians, neurologists About the editors: Alistair Steyn-Ross and Moira Steyn-Ross are computational and theoretical physicists in the Department of Engineering, University of Waikato, New Zealand. They share a long-standing interest in the application of physics-based methods to gain insight into the emergent behavior of complex biological systems such as single neurons and interacting neural populations

Título: Modeling Phase Transitions in the Brain Recurso electrónico-En línea] edited by D. Alistair Steyn-Ross, Moira Steyn-Ross

Editorial: New York, NY Springer New York 2010

Descripción física: XXV, 350p. 103 illus., 24 illus. in color. digital

Tipo Audiovisual: Medicine Neurosciences Anesthesiology Neurology Biology-Data processing Neurobiology Biomedicine Neurosciences Anesthesiology Neurology Computer Appl. in Life Sciences Neurobiology

Mención de serie: Springer Series in Computational Neuroscience 4

Documento fuente: Springer eBooks

Nota general: Biomedical and Life Sciences (Springer-11642)

Restricciones de acceso: Accesible sólo para usuarios de la UPV

Tipo recurso electrónico: Recurso a texto completo

Detalles del sistema: Forma de acceso: Web

ISBN: 9781441907967

Autores: Steyn-Ross, Moira

Entidades: SpringerLink (Servicio en línea)

Enlace a formato físico adicional: Printed edition 9781441907950

Punto acceso adicional serie-Título: Springer Series in Computational Neuroscience 4

Baratz Innovación Documental

- Gran Vía, 59 28013 Madrid
- (+34) 91 456 03 60
- informa@baratz.es