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## The Graph Theoretical Approach in Brain Functional Networks: Theory and Applications

By Fabrizio De Vico Fallani

Morgan & Claypool. Paperback. Book Condition: New. Paperback. 96 pages. Dimensions: 9.0in. x 7.4in. x 0.2in. The present book illustrates the theoretical aspects of several methodologies related to the possibility of i) enhancing the poor spatial information of the electroencephalographic (EEG) activity on the scalp and giving a measure of the electrical activity on the cortical surface. ii) estimating the directional influences between any given pair of channels in a multivariate dataset. iii) modeling the brain networks as graphs. The possible applications are discussed in three different experimental designs regarding i) the study of pathological conditions during a motor task, ii) the study of memory processes during a cognitive task iii) the study of the instantaneous dynamics throughout the evolution of a motor task in physiological conditions. The main outcome from all those studies indicates clearly that the performance of cognitive and motor tasks as well as the presence of neural diseases can affect the brain network topology. This evidence gives the power of reflecting cerebral states or traits to the mathematical indexes derived from the graph theory. In particular, the observed structural changes could critically depend on patterns of synchronization and desynchronization - i. e. the dynamic binding of neural...



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