1. Record Nr.   UNINA9910404075503321

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   Titolo   Kinetic Theory and Swarming Tools to Modeling Complex Systems—
                      Symmetry problems in the Science of Living Systems

   Pubbl/distr/stampa MDPI - Multidisciplinary Digital Publishing Institute, 2020

   ISBN   3-03928-880-6

   Descrizione fisica 1 electronic resource (118 p.)

   Lingua di pubblicazione Inglese

   Formato   Materiale a stampa

   Livello bibliografico Monografia

   Sommario/riassunto This MPDI book comprises a number of selected contributions to a
                       Special Issue devoted to the modeling and simulation of living systems
                       based on developments in kinetic mathematical tools. The focus is on a
                       fascinating research field which cannot be tackled by the approach of
                       the so-called hard sciences—specifically mathematics—without the
                       invention of new methods in view of a new mathematical theory. The
                       contents proposed by eight contributions witness the growing interest
                       of scientists this field. The first contribution is an editorial paper which
                       presents the motivations for studying the mathematics and physics of
                       living systems within the framework an interdisciplinary approach,
                       where mathematics and physics interact with specific fields of the class
                       of systems object of modeling and simulations. The different
                       contributions refer to economy, collective learning, cell motion,
                       vehicular traffic, crowd dynamics, and social swarms. The key problem
                       towards modeling consists in capturing the complexity features of
                       living systems. All articles refer to large systems of interaction living
                       entities and follow, towards modeling, a common rationale which
                       consists firstly in representing the system by a probability distribution
                       over the microscopic state of the said entities, secondly, in deriving a
                       general mathematical structure deemed to provide the conceptual basis
                       for the derivation of models and, finally, in implementing the said
                       structure by models of interactions at the microscopic scale. Therefore,
                       the modeling approach transfers the dynamics at the low scale to

collective behaviors. Interactions are modeled by theoretical tools of stochastic game theory. Overall, the interested reader will find, in the contents, a forward look comprising various research perspectives and issues, followed by hints on to tackle these.