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Nota di contenuto	Introduction -- Glass and jamming transitions in mean-eld models -- Supercooled liquids and the glass transition -- The Jamming Transition -- An Exactly Solvable Model: The Perceptron -- Universality Classes: Perceptron Versus Sphere Models -- The Jamming Paradigm in Ecology -- Lattice Theories Beyond Mean-eld -- The M-layer construction -- Conclusions -- Conclusions and Perspectives -- Appendix. .
Sommario/riassunto	The work described in this book originates from a major effort to develop a fundamental theory of the glass and the jamming transitions. The first chapters guide the reader through the phenomenology of supercooled liquids and structural glasses and provide the tools to analyze the most frequently used models able to predict the complex behavior of such systems. A fundamental outcome is a detailed

theoretical derivation of an effective thermodynamic potential, along with the study of anomalous vibrational properties of sphere systems. The interested reader can find in these pages a clear and deep analysis of mean-field models as well as the description of advanced beyond-mean-field perturbative expansions. To investigate important second-order phase transitions in lattice models, the last part of the book proposes an innovative theoretical approach, based on a multi-layer construction. The different methods developed in this thesis shed new light on important connections among constraint satisfaction problems, jamming and critical phenomena in complex systems, and lay part of the groundwork for a complete theory of amorphous solids.