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Nota di contenuto	1 Magnetohydrodynamics -- 2 Decay and Amplification of Magnetic Fields -- 3 Dynamo Models of the Solar Cycle -- 4 Fluctuations, Intermittency and Predictivity -- 5 Stellar Dynamos -- A Useful Identities and Theorems from Vector Calculus -- B Coordinate Systems and the Fluid Equations -- C Physical and Astronomical Constants -- D Maxwell's Equations and Physical Units -- Index.
Sommario/riassunto	Astrophysical dynamos are at the heart of cosmic magnetic fields of a wide range of scales, from planets and stars to entire galaxies. This book presents a thorough, step-by-step introduction to solar and stellar dynamos. Looking first at the ultimate origin of cosmic seed magnetic fields, the antagonists of field amplification are next considered: resistive decay, flux expulsion, and flows ruled out by anti-dynamo theorems. Two kinematic flows that can act as dynamos are then studied: the Roberts cell and the CP-flow. Mean-field electrodynamics and derivation of the mean-field dynamo equations lead to the alpha Omega-dynamo, the flux transport dynamo, and dynamos based on the Babcock-Leighton mechanism. Alternatives to the mean-field theory are also presented, as are global MHD dynamo simulations. Fluctuations and grand minima in the solar cycle are discussed in terms of dynamo modulations through stochastic forcing

and nonlinear effects. The book concludes with an overview of the major challenges in understanding stellar magnetic fields and their evolution in terms of various dynamo models, global MHD simulations, and fossil fields. Each chapter is accompanied by an annotated bibliography, guiding the readers to the relevant technical literature, which may lead them to carry out their own research in the field of dynamo theory.