

1. Record Nr.	UNINA9910768470403321
Autore	Kondratenko Ihor
Titolo	Interactions Between Electromagnetic Field and Moving Conducting Strip // Ihor Kondratenko, Yuriy Vasetsky, and Artur Zaporozhets
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2024] ©2024
ISBN	3-031-48274-3
Edizione	[First edition.]
Descrizione fisica	1 online resource (XIV, 119 p. 54 illus., 4 illus. in color.)
Collana	Lecture Notes in Electrical Engineering Series ; ; Volume 1111
Disciplina	530.141
Soggetti	Electromagnetic fields - Mathematical models Magnetic induction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Mathematical Models of Electromagnetic Interaction of Field Sources with Conducting Body -- Configuration of Spatial Iron-Free Inductors for High-Frequency Induction Heating of Metal Strips -- Electromagnetic Systems of Transverse Magnetic Flux with Ferromagnetic Core for Induction Heating Devices -- Electromagnetic Systems with Iron-Free Inductors for Induction Heating of Moving Strip in Transverse Magnetic Field.
Sommario/riassunto	The book combines two interrelated lines of research. One of them is devoted to the development of the theory for solving a certain class of three-dimensional electromagnetic field problems of the three-dimensional electromagnetic field, taking into account eddy currents in a moving conducting magnetizing body. Preference is given to the development of the analytical solution methods of the three-dimensional quasi-stationary problem of field conjugation in the system: "a contour of an arbitrary spatial configuration with an alternating current is conducting body with a flat boundary surface". The second direction refers to the development of mathematical models for solving applied problems, which involve the use of developed methods for calculating the electromagnetic field and their characteristics. The main application of calculation methods is aimed at solving problems of heat treatment non-ferrous and ferrous metal products using the induction method of heating in a transverse

magnetic field. The inverse problems are solved to determine the inductor configuration as flat and spatial current contours for providing the necessary temperature distribution of moving metal strips. To achieve uniform heating of strips across the width using inductors in the form of flat current contours parallel to the strip surface, it is advisable to use combinations of current contours, where the geometric dimensions are determined by the size and electro-physical parameters of the metal strips. A more uniform temperature distribution during high-frequency induction heating is achieved by using inductors in the form of current contours of the required spatial configuration. The book is intended for researchers, postgraduate students, and students specialized in theory and calculations of electromagnetic fields and induction heating installations.
