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	Sommario/riassunto	This is the first book to present a model, based on rational mechanics of electrorheological fluids, that takes into account the complex interactions between the electromagnetic fields and the moving liquid. Several constitutive relations for the Cauchy stress tensor are discussed. The main part of the book is devoted to a mathematical investigation of a model possessing shear-dependent viscosities, proving the existence and uniqueness of weak and strong solutions for the steady and the unsteady case. The PDS systems investigated possess so-called non-standard growth conditions. Existence results for elliptic systems with non-standard growth conditions and with a nontrivial nonlinear r.h.s. and the first ever results for parabolic systems with a non-standard growth conditions are given for the first time. Written for advanced graduate students, as well as for researchers in the field, the discussion of both the modeling and the mathematics