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	Nota di contenuto	Intro -- Preface -- Contents -- Notation-Related Comments -- 1 Introduction -- 1.1 Fluid Mechanics and Pseudo-Monotone Operator Theory: A Never-Ending Love Affair or Merely an On-Off Relationship? -- 1.2 Electro-Rheological Fluids -- 1.3 Aims and Outline of This Manuscript -- 1.3.1 Main Part -- 1.3.2 Extensions -- 2 Preliminaries -- 2.1 Theory of Pseudo-Monotone Operators -- 2.2 Variable Exponent Spaces -- 2.2.1 Classical Function Spaces -- 2.2.2 Variable Lebesgue Spaces -- 2.2.3 Duality in Variable Lebesgue Spaces -- 2.2.4 Variable Sobolev Spaces -- 2.2.5 The Hardy-Littlewood Maximal Operator and log-Hölder Continuity -- 2.2.6 Mollification in $L^{p(\cdot)}(\mathbb{R}^n)$ -- 2.3 Banach-Valued Function Spaces -- 2.3.1 Banach-Valued Classical Function Spaces -- 2.3.2 Bochner-Lebesgue Spaces -- 2.3.3 Bochner-Sobolev Spaces -- 2.3.4 Advanced Theory of Pseudo-Monotone Operators for Evolution Equations -- Part I Main Part -- 3 Variable Bochner-Lebesgue Spaces -- 3.1 The Spaces $X_{q,p}(Q_T)$ and $\mathcal{X}_{q,p}(Q_T)$ -- 3.2 Duality in $X_{q,p}$

| Sommario/riassunto | This book provides a comprehensive analysis of the existence of weak solutions of unsteady problems with variable exponents. The central motivation is the weak solvability of the unsteady p(.,.)-Navier–Stokes equations describing the motion of an incompressible electro-rheological fluid. Due to the variable dependence of the power-law index p(.,.) in this system, the classical weak existence analysis based on the pseudo-monotone operator theory in the framework of Bochner–Lebesgue spaces is not applicable. As a substitute for Bochner–Lebesgue spaces, variable Bochner–Lebesgue spaces are introduced and analyzed. In the mathematical framework of this substitute, the theory of pseudo-monotone operators is extended to unsteady problems with variable exponents, leading to the weak solvability of the unsteady p(.,.)-Navier–Stokes equations under general assumptions. Aimed primarily at graduate readers, the book develops the material step-by-step, starting with the basics of PDE theory andnon-linear functional analysis. The concise introductions at the |

beginning of each chapter, together with illustrative examples, graphics, detailed derivations of all results and a short summary of the functional analytic prerequisites, will ease newcomers into the subject.