1. Record Nr. UNINA9911020342803321 Autore Bourlès Henri Titolo System Theory -- a Modern Approach, Volume 1: Linear Ordinary and **Functional Differential Equations** Newark: .: John Wiley & Sons, Incorporated, . 2024 Pubbl/distr/stampa ©2024 **ISBN** 9781394297542 1394297548 Edizione [1st ed.] Descrizione fisica 1 online resource (315 pages) Collana Mathematics and statistics series. New mathematical methods, systems and applications set; volume 1 Disciplina 515/.35 Soggetti Differential equations Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Cover -- Title Page -- Copyright Page -- Contents -- Preface -- List of Nota di contenuto Notations -- Chapter 1 Representation of Systems: A Historical Overview -- 1.1. Transfer functions and matrices -- 1.1.1. Transfer functions -- 1.1.2. Transfer matrices -- 1.1.3. The discrete-time case -- 1.2. State-space representation -- 1.2.1. Continuous-time statespace systems -- 1.2.2. Discrete-time state-space systems -- 1.2.3. Controllability and observability -- 1.2.4. Poles of a state-space system -- 1.2.5. Stability of linear time-invariant systems -- 1.3. "Geometric" approach -- 1.3.1. Formalism of the geometric approach -- 1.3.2. Reachable and non-observable subspaces -- 1.3.3. State-feedback controls, observers -- 1.3.4. Canonical Kalman decomposition, stabilizability and detectability -- 1.4. Polynomial matrix description --1.4.1. PBH test (Hautus criterion) -- 1.4.2. Rosenbrock representation -- 1.5. The behavioral approach -- 1.5.1. Controllability without control variables -- 1.5.2. Observability in the behavioral approach --1.6. Module of a system -- 1.6.1. Using modules in control theory --1.6.2. The Fliessian approach -- 1.6.3. Characterization in terms of modules of controllability and observability -- 1.7. The formalism of algebraic analysis -- 1.7.1. Nature of algebraic analysis -- 1.7.2. Oberst's contribution and its consequences -- Chapter 2 Linear

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and Functional Differential Equations' provides a comprehensive exploration of system theory, focusing on mathematical methods and their applications. The book delves into key concepts such as transfer functions, state-space systems, and algebraic analysis, offering a historical overview and modern insights into system theory. It discusses the stability, observability, and control of linear systems using various mathematical approaches, including geometric and algebraic methods. Intended for researchers, students, and professionals in engineering and applied mathematics, the book aims to enhance understanding and application of system theory in complex systems.