1. Record Nr.   UNINA9910438153303321

   Autore   Lamour Rene

   Titolo   Differential-algebraic equations : a projector based analysis / / Rene Lamour, Roswitha Marz, Caren Tischendorf

   Pubbl/distr/stampa   New York, : Springer, 2013

   ISBN   1-299-19751-5
                        3-642-27555-9

   Edizione   [1st ed. 2013.]

   Descrizione fisica   1 online resource (xxvii, 649 pages) : illustrations (some color)

   Collana   Differential-algebraic equations forum

   Altri autori (Persone)   MarzRoswitha
                            TischendorfCaren

   Disciplina   515.38

   Soggetti   Differential-algebraic equations

   Lingua di pubblicazione   Inglese

   Formato   Materiale a stampa

   Livello bibliografico   Monografia

   Note generali   Description based upon print version of record.

   Nota di bibliografia   Includes bibliographical references and index.

   Nota di contenuto   pt. I. Projector based approach -- pt. II. Index-1 DAEs : analysis and numerical treatment -- pt. III. Computational aspects -- pt. IV. Advanced topics.

   Sommario/riassunto   Differential algebraic equations (DAEs), including so-called descriptor systems, began to attract significant research interest in applied and numerical mathematics in the early 1980s, no more than about three decades ago. In this relatively short time, DAEs have become a widely acknowledged tool to model processes subjected to certain constraints in order to simulate and to control processes in various application fields such as network simulation, chemical kinematics, mechanical engineering and systems biology. DAEs and their more abstract versions in infinite dimensional spaces comprise a great potential for the future mathematical modeling of complex coupled processes. The purpose of the book is to expose the impressive complexity of general DAEs from an analytical point of view, to describe the state of the art as well as open problems and in so doing to motivate further research of this versatile, extraordinary topic from a broader mathematical perspective. The book elaborates on a new general, structural analysis capturing linear and nonlinear DAEs in a hierarchical way. The DAE structure is exposed by means of special projector functions. Some issues on numerical integration and computational aspects are also