1. Record Nr. UNINA9910366600403321

Autore	Allen Matthew S
Titolo	Substructuring in Engineering Dynamics : Emerging Numerical and Experimental Techniques / / by Matthew S. Allen, Daniel Rixen, Maarten van der Seijs, Paolo Tiso, Thomas Abrahamsson, Randall L. Mayes
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-25532-8
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (284 pages)
Collana	CISM International Centre for Mechanical Sciences, Courses and Lectures, , 2309-3706 ; ; 594
Disciplina	624.171 620.104015118
Soggetti	Multibody systems Vibration Mechanics, Applied Solids Mathematics - Data processing Multibody Systems and Mechanical Vibrations Solid Mechanics Computational Science and Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction and motivation -- Preliminaries: primal and dual assembly of dynamic models -- Model reduction concepts and subsctructuring approaches for linear systems -- Experimental substructuring -- Industrial applications related concepts -- Model reduction concepts and substructuring approaches for non-linear systems -- Weakly nonlinear systems: modeling and experimental methods -- References.
Sommario/riassunto	Dynamic Substructuring is a method that combines models for the various parts of a structure to estimate the dynamic response or other properties of the assembled structure. The substructure models may be analytical models such as finite element models, or they may be derived from measurements. This book reviews the most common state-of-the art methods for substructuring and model reduction and

presents a framework that encompasses most method, highlighting their similarities and differences. For example, popular methods such as Component Mode Synthesis, Hurty/Craig-Bampton, and the Rubin methods, which are popular within finite element software, are reviewed. Similarly, experimental-to-analytical substructuring methods such as impedance/frequency response based substructuring, modal substructuring and the transmission simulator method are presented. The overarching mathematical concepts are reviewed, as well as practical details needed to implement the methods. Various examples are presented to elucidate the methods, ranging from academic examples such as spring-mass systems, which serve to clarify the concepts, to real industrial case studies involving automotive and aerospace structures. The wealth of examples presented reveal both the potential and limitations of the methods.