

1. Record Nr.	UNINA9910140611603321
Autore	Huang X (Xiaodong), <1972->
Titolo	Evolutionary topology optimization of continuum structures [[electronic resource]] : methods and applications / / X. Huang, Y.M. Xie
Pubbl/distr/stampa	Chichester, West Sussex, U.K. ; ; Hoboken, NJ, : Wiley, 2010
ISBN	1-282-54873-5 9786612548734 0-470-68948-X 0-470-68947-1
Descrizione fisica	1 online resource (237 p.)
Altri autori (Persone)	XieY. M
Disciplina	624.1/7713
Soggetti	Structural optimization Topology
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	EVOLUTIONARY TOPOLOGY OPTIMIZATION OF CONTINUUM STRUCTURES; Contents; Preface; 1 Introduction; 1.1 Structural Optimization; 1.2 Topology Optimization of Continuum Structures; 1.3 ESO/BESO and the Layout of the Book; References; 2 Evolutionary Structural Optimization Method; 2.1 Introduction; 2.2 ESO Based on Stress Level; 2.2.1 Evolutionary Procedure; 2.2.2 Example of Two-bar Frame; 2.2.3 Examples of Michell Type Structures; 2.3 ESO for Stiffness or Displacement Optimization; 2.3.1 Sensitivity Number and Evolutionary Procedure; 2.3.2 Example of a Short Cantilever 2.3.3 Example of a Beam Structure 2.4 Conclusion; References; 3 Bi- directional Evolutionary Structural Optimization Method; 3.1 Introduction; 3.2 Problem Statement and Sensitivity Number; 3.2.1 Problem Statement; 3.2.2 Sensitivity Number; 3.3 Filter Scheme and Improved Sensitivity Number; 3.3.1 Checkerboard and Mesh- dependency Problems; 3.3.2 Filter Scheme for BESO Method; 3.3.3 Stabilizing the Evolutionary Process; 3.4 Element Removal/Addition and Convergence Criterion; 3.5 Basic BESO Procedure; 3.6 Examples of BESO Starting from Initial Full Design 3.6.1 Topology Optimization of a Short Cantilever 3.6.2 Topology

Optimization of a Beam; 3.7 Examples of BESO Starting from Initial Guess Design; 3.8 Example of a 3D Structure; 3.9 Mesh-independence Studies; 3.10 Conclusion; References; 4 BESO Utilizing Material Interpolation Scheme with Penalization; 4.1 Introduction; 4.2 Problem Statement and Material Interpolation Scheme; 4.2.1 Problem Statement; 4.2.2 Material Interpolation Scheme; 4.3 Sensitivity Analysis and Sensitivity Number; 4.3.1 Sensitivity Analysis; 4.3.2 Sensitivity Number; 4.4 Examples
4.4.1 Topology Optimization of a Short Cantilever
4.4.2 Topology Optimization of a Beam; 4.4.3 Topology Optimization of a 3D Cantilever; 4.5 Conclusion; Appendix 4.1; References; 5 Comparing BESO with Other Topology Optimization Methods; 5.1 Introduction; 5.2 The SIMP Method; 5.3 Comparing BESO with SIMP; 5.3.1 Comparison of Topology Optimization Algorithms without a Mesh-independency Filter; 5.3.2 Comparison of Topology Optimization Algorithms with a Mesh-independency Filter; 5.3.3 Advantages of the BESO Method and Questions yet to be Resolved
5.4 Discussion on Zhou and Rozvany (2001) Example
5.4.1 Introduction of Zhou and Rozvany (2001) Example; 5.4.2 Is it a Nonoptimal or a Local Optimal Solution?; 5.4.3 Avoidance of Highly Inefficient Local Optimum; 5.5 Conclusion; References; 6 BESO for Extended Topology Optimization Problems; 6.1 Introduction; 6.2 Minimizing Structural Volume with a Displacement or Compliance Constraint; 6.2.1 Sensitivity Analysis and Sensitivity Number; 6.2.2 Determination of Structural Volume; 6.2.3 Examples; 6.3 Stiffness Optimization with an Additional Displacement Constraint; 6.3.1 Sensitivity Number
6.3.2 Determination of Lagrangian Multiplier

Sommario/riassunto

Evolutionary Topology Optimization of Continuum Structures treads new ground with a comprehensive study on the techniques and applications of evolutionary structural optimization (ESO) and its later version bi-directional ESO (BESO) methods. Since the ESO method was first introduced by Xie and Steven in 1992 and the publication of their well-known book Evolutionary Structural Optimization in 1997, there have been significant improvements in the techniques as well as important practical applications. The authors present these developments, illustrated by numerous interesting and d
