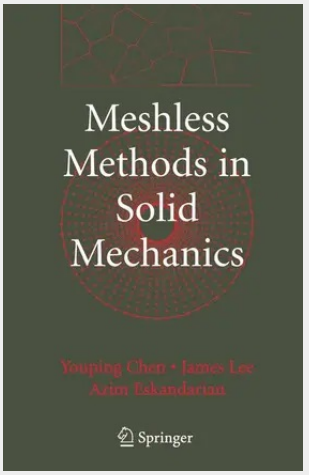
Chen / Lee / Eskandarian

Meshless Methods in Solid Mechanics



Finite element method has been the dominant technique in computational mechanics in the past decades, but this method is not well suited to problems having severe mesh distortion. This book covers the fundamentals of continuum mechanics, the integral formulation methods of continuum problems, the basic concepts of finite element methods, and the methodologies, formulations, procedures, and applications of various meshless methods. It also provides general and detailed procedures of meshless analysis on elastostatics, elastodynamics, non-local continuum mechanics and plasticity with a large number of numerical examples. Some basic and important mathematical methods are included in the Appendixes. For readers who want to gain knowledge through hands-on experience, the meshless programs for elastostatics and elastodynamics are also introduced in the book and included in the disc.

Finiteelementmethodhasbeenthedominanttechniqueincomputationalmech- icsinthepastdecades,andithasmadesigni?cantcontributionstothedevelopments in engineering and science. Nevertheless, FEM is not well suited to problems h- ing severe mesh distortion owing to extremely large deformations of materials, encountering moving discontinuities such as crack propagation along arbitrary and complex paths, involving considerable meshings and remeshings in structural optimization problems, or having multidomain of in?uence in multiphenomena physical problems. It is impossible to completely overcome those mesh-related dif?culties by a mesh-based method. The highly structured nature of ?nite e- ment approximations imposes severe penalties in seeking the solutions of those problems. Distinguishing with ?nite element, ?nite difference, and ?nite volume methods, meshless method discretizes the continuum body only with a set of nodal points andtheapproximationisconstructedentirelyintermsofnodes.Thereisnoneedof mesh or elements in this method. It does not possess the mesh-related dif?culties and provides an approach with more ?exibility in the applications in engineering and science. The meshless method started to capture the interest of a broader community of researchers only several years ago, and now it becomes a growing and evolving ?eld. It is showing that this is a very rich area to be explored, and has great promise for many very challenging computational problems. On the one hand, great advances of meshless methods have been achieved. On the other hand, there are many aspects of meshless methods that could bene?t from improvements. A broadercommunityofresearcherscanbringdiverseskillsandbackgroundstobear on the task of improving this method.

53,49 €
49,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781441921482
Medium: Buch
ISBN: 978-1-4419-2148-2
Verlag: Springer
Erscheinungstermin: 29.10.2010
Sprache(n): Englisch
Auflage: Softcover Nachdruck of hardcover 1. Auflage 2006
Produktform: Kartoniert
Gewicht: 330 g
Seiten: 200
Format (B x H): 155 x 235 mm

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)