

1. Record Nr.	UNINA9910299744403321
Autore	Belinha Jorge
Titolo	Meshless Methods in Biomechanics [[electronic resource]] : Bone Tissue Remodelling Analysis // by Jorge Belinha
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-06400-2
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (328 p.)
Collana	Lecture Notes in Computational Vision and Biomechanics, , 2212-9391 ; ; 16
Disciplina	616.2407
Soggetti	Biomedical engineering Mechanics Mechanics, Applied Numerical analysis Computer mathematics Mechanical engineering Biomedical Engineering and Bioengineering Solid Mechanics Numerical Analysis Computational Science and Engineering Mechanical Engineering
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	1. Introduction -- 1.1 Meshless Methods -- 1.2 Natural Neighbour Radial Point Interpolation Method -- 1.3 Bone tissue remodelling analysis -- 1.4 Book Purpose -- 1.5 Meshless method software -- 1.6 Book arrangement -- 2. Solid Mechanics Fundamentals -- 2.1 Continuum formulation -- 2.2 Weak form -- 2.3 Discrete system of equations -- 3. Meshless Methods Introduction -- 3.1 Meshless generic procedure -- 3.2 Nodal connectivity -- 3.3 Numerical integration -- 3.4 Numerical implementation -- 4. Shape Functions -- 4.1 Introduction -- 4.2 Support-Domain -- 4.3 Moving Least Squares -- 4.4 Radial Point Interpolators -- 5. Solid Mechanics Problems -- 5.1 Solid Mechanics NNRPIM flow chart -- 5.2 RPI shape function patch test

-- 5.3 Elastostatic numerical examples -- 5.4 Elastodynamic numerical examples -- 6. Bone Tissue -- 6.1 Bone biology: Basic concepts -- 6.2 Bone tissue mechanical properties -- 6.3 Bone remodelling algorithms -- 7. Bone Tissue Remodelling Analysis -- 7.1 Bone Patch Analysis -- 7.2 Bone Structures -- 7.3 Implants -- 8. References -- 9. Subject Index.

Sommario/riassunto

This book presents the complete formulation of a new advanced discretization meshless technique: the Natural Neighbour Radial Point Interpolation Method (NNRPIM). In addition, two of the most popular meshless methods, the EFGM and the RPIM, are fully presented. Being a truly meshless method, the major advantages of the NNRPIM over the FEM, and other meshless methods, are the remeshing flexibility and the higher accuracy of the obtained variable field. Using the natural neighbour concept, the NNRPIM permits to determine organically the influence-domain, resembling the cellulae natural behaviour. This innovation permits the analysis of convex boundaries and extremely irregular meshes, which is an advantage in the biomechanical analysis, with no extra computational effort associated. This volume shows how to extend the NNRPIM to the bone tissue remodelling analysis, expecting to contribute with new numerical tools and strategies in order to permit a more efficient numerical biomechanical analysis.
