

Accepted Manuscript

Developing a four-dimensional lattice spring model for mechanical responses of solids

Gao-Feng Zhao

PII: S0045-7825(16)30936-7

DOI: <http://dx.doi.org/10.1016/j.cma.2016.11.034>

Reference: CMA 11244

To appear in: *Comput. Methods Appl. Mech. Engrg.*

Received date: 22 August 2016

Revised date: 2 November 2016

Accepted date: 30 November 2016

Please cite this article as: G.-F. Zhao, Developing a four-dimensional lattice spring model for mechanical responses of solids, *Comput. Methods Appl. Mech. Engrg.* (2016), <http://dx.doi.org/10.1016/j.cma.2016.11.034>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Developing a four-dimensional lattice spring model for mechanical responses of solids

Gao-Feng Zhao*

State Key Laboratory of Hydraulic Engineering Simulation and Safety, School of Civil Engineering, Tianjin University, Tianjin, 300072, China

Abstract

In this work, a four-dimensional lattice spring model is developed for studying the mechanical responses of solids. Our results indicate that the Poisson's ratio limitation of the classical lattice spring model defined in three-dimensional space can be released by introducing an extra fourth-dimensional interaction. The fourth-dimensional lattice spring model adopts central interactions only, and it can naturally represent the nonlinear dynamic responses of solids without special treatment of rigid body rotation or incremental integration of non-central/non-local interaction as used in the traditional methods. Applicability of the model is illustrated from a few numerical examples.

Keywords: Extra dimension; Lattice Spring Model; Solids; Poisson's ratio

* Corresponding author: Email: gaofeng.zhao@tju.edu.cn

Tel: + 8618202617978

Download English Version:

<https://daneshyari.com/en/article/4964186>

Download Persian Version:

<https://daneshyari.com/article/4964186>

[Daneshyari.com](https://daneshyari.com)