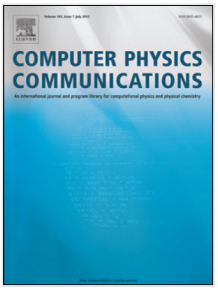
Accepted Manuscript



Solving the Christoffel equation: Phase and group velocities

Jan W. Jaeken, Stefaan Cottenier

PII: S0010-4655(16)30179-5
DOI: http://dx.doi.org/10.1016/j.cpc.2016.06.014
Reference: COMPHY 5975

To appear in: *Computer Physics Communications*

Received date: 15 February 2016
Revised date: 13 June 2016
Accepted date: 15 June 2016

Please cite this article as: J.W. Jaeken, S. Cottenier, Solving the Christoffel equation: Phase and group velocities, *Computer Physics Communications* (2016), http://dx.doi.org/10.1016/j.cpc.2016.06.014

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.

ACCEPTED MANUSCRIPT

*Manuscript

Solving the Christoffel equation: phase and group velocities

Jan W. Jaeken[a,*], Stefaan Cottenier[a,b]

[a] *Center for Molecular Modeling, Ghent University, Technologiepark 903, 9052 Zwijnaarde, Belgium*
[b] *Department of Material Science and Engineering, Technologiepark 903, 9052 Zwijnaarde, Belgium*

Abstract

We provide `christoffel`, a Python tool for calculating direction-dependent phase velocities, polarization vectors, group velocities, power flow angles and enhancement factors based on the stiffness tensor of a solid. It is built in a modular way to allow for efficient and flexible calculations, and the freedom to select and combine results as desired. All derivatives are calculated analytically, which circumvents possible numerical sampling problems. GNUPlot scripts are provided for convenient visualization.

Keywords: Christoffel equation; Acoustic waves; Sound velocity; Phase velocity; Group velocity; Enhancement factor

PROGRAM SUMMARY

Program Title: Christoffel
Journal Reference:
Catalogue identifier:
Licensing provisions: GNU General Public Licence, version 3
Programming language: Python
Computer: Workstations
Operating system: Linux/UNIX/Windows/MacOS
Keywords: Christoffel equation, Stiffness tensor, Acoustic waves, Sound velocity, Phase velocity, Group velocity, Enhancement factor
Classification: 7.8

*Corresponding author.
E-mail address: jan.jaeken@ugent.be

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/4964650

Download Persian Version:

https://daneshyari.com/article/4964650

Daneshyari.com