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任意各向异性介质相(群)速度的计算

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Calculation of phase and group velocities in an arbitrary anisotropic medium (AAM)

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摘要

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摘要 反映弹性波在各向异性介质中传播特性的两个基础的物理量是相速度和群速度. 本文在总结前人工作的基础上, 提出任意各向异性介质相(群)速度的计算方案: 首先推导各自计算公式, 其次考虑剪切波奇点的特殊性, 再次令其遵循相应约束条件, 最后, 采用三个计算实例检验该方案的正确性和有效性. 通过对计算结果的分析以及各向异性理论预测可以加深对各向异性特有性质(如剪切波奇点、群速度多值性)的理解, 有助于增强我们对任意各向异性理论的基本认识.

关键词 任意各向异性介质, 相速度, 群速度, 极性向量, 剪切波分裂

Abstract: Both phase velocity and group velocity are the essential vectors which could mirror the seismic wave propagation properties of anisotropic media. The shear wave splitting and triplication of group velocity are notable and specific phenomena which often complicate the seismic wave field particularly for anisotropic media with a lower symmetric system. In this paper, we propose an available workflow of calculation on phase (group) velocity in an arbitrary anisotropy medium (AAM). There are two existing obstacles we should focus on, which are shear wave singularity and distinguish of two shear wave. The way to overcome those difficulties is finding more constrain conditions to make the solutions meaningful and continuous. Three examples presented in this paper show that the workflow works well in AAM, however, more attention should be paid to the area around shear wave singularity, particularly for higher-symmetric-system anisotropic media.

Keywords [Arbitrary anisotropy medium](#), [Phase velocity](#), [Group velocity](#), [Polarization vector](#), [Shear wave splitting](#)

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