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**A new issue of LA RIVISTA DEL NUOVO CIMENTO della *Società Italiana di Fisica* on the numerical methods for acoustic and elastic wave propagation**

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## **Numerical modeling of mechanical wave propagation**

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When complex systems in heterogeneous and composite media are investigated, from the micro to the macro phenomena in any field of theoretical and applied sciences, in general analytical closed solutions do not exist and the only available tools are the computational simulations. Different classes of numerical methods are routinely used for computational simulations. They differ in the mathematical approach and in the type of space discretization.

In this paper we present a review of numerical methods that have been developed and are currently used. In particular we present the key concepts and pioneering ideas behind finite-difference methods, pseudospectral methods, finite-volume methods, Galerkin continuous and discontinuous finite-element methods, and still others such as physics-compatible, and multiscale methods. We focus on the modeling of mechanical wave propagation which is the core business of fields such as computational seismology or ultrasonic diagnostics in materials science and medicine.