Recent Developments in Nonlocal Elasticity: Gradient and Integral Approaches

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Proposed by Eringen in the early 1960s, continuum models based on nonlocal elastic stress-strain laws are currently used for simplified modeling of micro- and nano-beams and rods. In particular, nonlocal elastic models can capture some effects which the classical continuum models cannot, such as the size effect (i.e., an increase of apparent material stiffness at decreasing structural size) and dispersive effects in dynamics. The number of variants of nonlocal elasticity models published on this subject is huge. In the seminar, gradient and integral approaches are considered. Some common and distinguishing properties are underlined. A tentative critical comparison is proposed in order to put into evidence that the choice of the proper nonlocal approach depends on the specific type of application that is envisaged.

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