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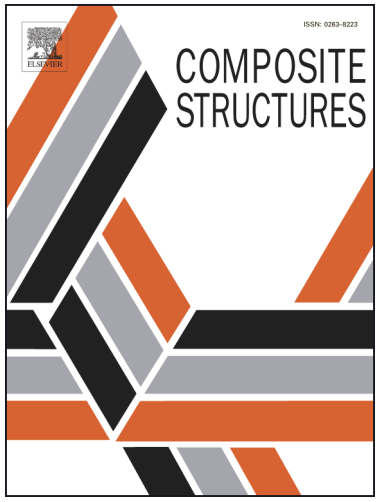

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MECHANICAL BEHAVIOUR OF COMPOSITE COSSERAT SOLIDS IN ELASTIC PROBLEMS WITH HOLES AND DISCONTINUITIES

Francesco Tornabene*[1], Nicholas Fantuzzi[1], Michele Bacciocchi[1]

ABSTRACT. Cosserat theory of elasticity has been introduced for modelling micro-structured materials and structures. Micro-structured materials are able to re-distribute the stress resulting in lower stress peaks. Therefore, such effects are strongly underlined when composite structures have holes and discontinuities in which high stress gradients are generally observed in the classical theory of elasticity. However, general material configurations can be solved using numerical approaches, since exact solutions are only available for simple cases. The present paper deals with such problems using an advanced strong form pseudo-spectral method that uses domain decomposition to deal with geometric and material discontinuities.

KEYWORDS: Cosserat theory, Micropolar elasticity, Solids with discontinuities, Pseudo-spectral method, Domain decomposition.

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