**HIERARCHY OF GENERALIZED CONTINUA ISSUED FROM MICROMORPHIC MEDIUM CONSTRUCTED BY HOMOGENIZATION**

# J.F. Ganghoffer², E. Alavi¹, and M. Sadighi³

1. Department of Mechanical Engineering, Amirkabir University of Technology (Tehran Polytechnic), 424 Hafez Ave., Tehran 15875, Iran. seyed-ehsan.alavi@univ-lorraine.fr
2. LEM3. Université de Lorraine, CNRS. 7, rue Félix Savart, 57073, Metz, France. Jean-francois.Ganghoffer@univ-lorraine.fr

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The present contribution aims to provide a classification of generalized continua constructed by a micromechanical approach, relying on an extension of Hill macrohomogeneity condition. Starting from the microscopic Cauchy balance equations, the virtual power of equilibrium for a micromorphic effective medium is derived, highlighting the classical and higher order macroscopic stress tensors. The so-called homogeneous displacement associated to the micromorphic effective medium is derived based on variational formulations; it then allows to establish the extended Hill macrohomogeneity condition that prevails for the micromorphic continuum. The micromorphic homogenization theory is then completed by the formal writing of the homogenized constitutive law. Suitable projections of the introduced kinematic micromorphic variables into degenerated kinematic variables lead to a variety of subclasses of generalized continua: microstretch, micropolar, microdilatation, microstrain, microshear and strain gradient. The construction of the static macroscopic variables conjugated to the macroscopic kinematic variables that pertain to each of the degenerated effective media relies on the additive decomposition of the microscopic displacement into a homogeneous part and a fluctuation, computed by solving numerically higher order unit cell boundary value problems. The obtained results highlight that the higher-order moduli converge very quickly with unit cell size, due to the consideration of correction factors based on the higher-order moments of area. The homogenized constitutive laws are written for the derived effective continuum. Numerical illustrations are done for the case of micromorphic substution media of architected tetrachiral plates, showing the global and local excellent accuracy of the derived micromorphic model. An asymptotic ranking of the family of generalized continua versus a small-scale parameter is formulated.

**REFERENCES**

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