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$\mu$ -GM: A Purely Micromechanical Constitutive Model for Granular Materials

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**Highlights**

- A novel constitutive modelling framework (-GM) for granular materials is developed based primarily on micromechanical considerations.
- The constitutive model is founded on the decomposition of particle-scale mechanisms into dissipative and non-dissipative, which is different from common elastic/plastic dichotomy.
- By including only three calibration parameters, the -GM constitutive model is shown to successfully predict stress-strain response, as well as the evolution of key micro-variables such as fabric anisotropy and coordination number for 2D granular assemblies.
- Within a boundary-value problem setting, -GM constitutive model gives access to rich local particle-scale information, thus circumventing computationally expensive DEM simulations of large granular assemblies.

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