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Elastic properties of fractured rocks

Francis Muir & Dave Nichols[1]

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ABSTRACT

Recent work on equivalent elastic medium theory is modified and extended beyond fine-layered anisotropic rocks to include multiple fracture sets, lying anywhichway. The group-theoretic structure is still basic, but group elements are now in terms of compliances rather than stiffnesses, and this much simplifies the algebra, and makes the commutative property clear – rocks can be fractured in any order. This then leads to a method for modeling the effect of fracture distributions. This new model also provides a unifying framework to compare the several specialized fracture models in the literature. Several simple but physically reasonable examples are given.

[1]**email:** not available