Abstract Submitted
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Application of the finite element method to resonant ultrasound spectroscopy data analysis.[1] A. SUSLOV, I. DIXON, S. HEADLEY, E. DEYLE, NHMFL, Tallahassee, FL, A. MIGLIORI, LANL, Los-Alamos, NM. — Commercially available finite-element software is used to determine elastic moduli from experimental data acquired by resonant ultrasound spectroscopy (RUS) on an arbitrarily-shaped sample. The sample geometry must be provided in coordinate form, as well as the crystallographic symmetry and the crystallographic orientation relative to the coordinates. The algorithm has been tested on published resonance measurements obtained on rectangular parallelepipeds and cylinders of cubic, tetragonal, hexagonal and monoclinic symmetries. The results agree within expected numerical precision to the elastic constants found by other computational methods. The algorithm is much slower than the one normally implemented explicitly for RUS analysis but, for difficult-to-prepare or fragile samples such as a layered specimen prepared from several materials, moduli can be obtained without polishing or otherwise damaging the sample. Details of the model generation, meshing and optimization approach will be discussed.

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