Variational Principles for Acoustics, Elastodynamics and Electromagnetism

Graeme W. MILTON

Department of Mathematics
University of Utah, USA

Email: milton@math.utah.edu

The Dirichlet and Thompson energy minimization variational principles for electrical conductivity are well known, as are the analogous variational principles for elasticity. Less well, known is the result of Cherkaev and Gibiansky that these variational principles can be extended to allow for complex conductivity tensors, and complex elasticity tensors, corresponding to the quasistatic limit where the wavelength is much larger than the body. Here we show that these variational principles can be extended to the full equations of acoustics, elastodynamics and electromagnetism at any fixed frequency, not just in the quasistatic limit. This is joint work with Guy Bouchitte and Pierre Seppecher.