

1121-35-12

**Brian Seguin\*** (bseguin@luc.edu), Department of Mathematics and Statistics, 1032 W. Sheridan Rd., Chicago, IL 60660. *Homogenization of locally periodic microstructures with anisotropy and residual stress.*

Many biological and engineering materials have nonperiodic microstructures for which classical periodic homogenization results do not apply. Certain nonperiodic microstructures may be approximated by locally periodic microstructures for which homogenization techniques are available. Motivated by the consideration that such materials are often anisotropic and can possess residual stresses, I will introduce a broad class of locally periodic microstructures and present the resulting effective macroscopic equations. The effective residual stress and effective elasticity tensor are determined by solving unit cell problems at each point in the domain. However, I will show that for a certain class of locally periodic microstructures, solving the unit cell problem at only one point in the domain completely determines the effective elasticity tensor. I will also outline how certain nonperiodic microstructures can be approximated by locally periodic ones. (Received June 16, 2016)