

# Spectral and evolution analysis of thin elastic domains in high-contrast regime

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We provide rigorous derivation of effective models of thin heterogeneous elastic plates with material coefficients being in high contrast by the means of two-scale convergence.

The main part of the analysis is establishing the two-scale resolvent convergence of the underlying differential operators in the setting when the thickness of the plate and the period of material oscillations tend simultaneously to zero with various relative orders of magnitudes. This approximation result allows us to analyse the approximation properties of spectrum and evolution equations.

In the case of critical contrast of the material coefficients, the limit model exhibits interesting meta-material properties such as spectral gaps and memory effects. We explain the effects of different magnitudes of contrast and its consequences on the resulting effective model in different regimes.

This is joint work with M. Bužančić, K. Cherednichenko and I. Velčić.