Operator-norm asymptotics for thin elastic rods with rapidly oscillating periodic properties

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We provide norm-resolvent estimates in \( L^2 \rightarrow L^2 \) and \( L^2 \rightarrow H^1 \) operator norms, for the class of problems in linear elasticity describing heterogeneous rods with rapidly oscillating coefficients in the regime of moderate contrast.

The estimates are provided with respect to the period of material oscillations in the setting of simultaneous homogenization and dimension reduction, while assuming that the period and the rod thickness are of the same order. These estimates are expected to provide also sharp estimates for the corresponding evolution problems.

The analysis is performed by the means of spectral analysis and Gelfand transform.

This is joint work with K. Cherednichenko and I. Velčić.