

Sharp operator-norm asymptotics for linearised elastic plates with rapidly oscillating periodic properties

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Abstract

In this talk we analyse a system of partial differential equations describing the behaviour of an elastic plate with periodic moduli in the two planar directions. We assume that the displacement gradients of the points of the plate are small enough for the equations of linearised elasticity to be a suitable approximation of the material response. Following the application of an appropriate version of the Floquet transform, we analyse the operator-norm resolvent behaviour of the operators in each fibre of the resulting direct integral, as the period and the plate thickness go to zero simultaneously. The convergence estimates we obtain are uniform with respect to both the Floquet parameter and the plate thickness, which yields order-sharp resolvent estimates for the convergence of the original plate problems as the plate thickness goes to zero. We use the approach of Cherednichenko, Cooper (ARMA 219, 1061-1086 (2016)) where they analyzed high-contrast elliptic equation. This is a joint work with Kirill Cherednichenko (University of Bath).