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Operator-norm resolvent homogenisation estimates for the system of Maxwell equations on periodic singular structures

I will discuss a new approach to obtaining uniform operator asymptotic estimates in periodic homogenisation, in a general setting of the inhomogeneous structure being modelled by an arbitrary Borel measure. Based on a novel uniform Poincaré-type inequality, in the Lebesgue measure setting it bears a similarity with the technique of Cherednichenko and Cooper (ARMA, 2016).

In the context of the Maxwell system, our analysis leads to a new representation for the asymptotics obtained by Suslina in 2007 for the full system, as well as related results by Birman and Suslina in 2007 (for the "non-magnetic" case) and by Suslina in 2004 (for the magnetic field and induction in the presence of currents). As part of our asymptotic construction, we explicitly link our approximation to a family of "homogenised" problems.

This is joint work with Serena D'Onofrio (Bath).