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*Operator error estimates for homogenization
of periodic hyperbolic systems*

In $L_2(\mathbb{R}^d; \mathbb{C}^n)$, we consider a matrix elliptic second order differential operator A_ε given in a factorized form. The coefficients of the operator A_ε are periodic and depend on \mathbf{x}/ε . So, they oscillate rapidly as $\varepsilon \rightarrow 0$. Our first result is approximation of the operator $A_\varepsilon^{-1/2} \sin(tA_\varepsilon^{1/2})$ in the $(H^1 \rightarrow L_2)$ -operator norm. Our second result is approximation in the $(H^2 \rightarrow H^1)$ -operator norm with the correction term is taken into account. The results are applied to homogenization of periodic hyperbolic systems.

We use the spectral approach to homogenization problems developed by M. Sh. Birman and T. A. Suslina. The method is based on the scaling transformation, the Floquet-Bloch theory and analytic perturbation theory. It turns out that homogenization is a spectral threshold effect at the bottom of the spectrum.

More details can be found at [arXiv:1705.02531](https://arxiv.org/abs/1705.02531).