1077-35-1547 **Leonid Berlyand*** (berlyand@math.psu.edu), Department of Mathematics, Penn State University, University Park, PA 16802, and **Houman Owhadi**. *Flux norm approach to finite-dimensional homogenization approximation with non-separated scales and high contrast.*

The homogenization of PDEs with periodic or random ergodic coefficients and well-separated scales is well understood. In a joint work with H. Owhadi (Caltech) we consider the most general case of arbitrary L^∞ coefficients, which may contain infinitely many scales that are not necessarily well-separated. Specifically, we study scalar and vectorial divergence-form elliptic PDEs with such coefficients. We establish two finite-dimensional homogenization approximations that generalize the *correctors* in classical homogenization. We introduce a flux norm and establish the error estimate in this norm with an explicit and *optimal* error constant *independent of the contrast* and regularity of the coefficients. A proper generalization of the notion of a cell problem is the key issue in our consideration. (Received September 20, 2011)