

Maria Neuss-Radu

Multiscale methods for transport processes through membranes

In our contribution, we develop multiscale methods for the derivation of effective models in environments containing membranes. Thereby, the techniques developed in [1] for the derivation of effective transmission conditions across flat interfaces are further extended to include curved membranes. This step requires new concepts like periodicity on manifolds and curved layers, and two-scale convergence with respect to charts. The derived models can be applied e.g. in the mathematical modeling of intracellular processes (metabolic or regulatory ones), where intracellular membrane systems essentially influence the spatial distribution of cellular compounds.

[1] M. Neuss-Radu, W. Jäger: Effective transmission conditions for reaction-diffusion processes in domains separated by an interface. *SIAM J. Math. Anal.* 39, 687-720, 2007.