

Abstract:

The talk addresses error estimates for partial differential equations with coefficients that are not exactly ε -periodic, where $\varepsilon > 0$ denotes the ratio between the microscopic and the macroscopic length scale. The first part is devoted to the derivation of quantitative estimates for linear elliptic equations where the ellipticity may degenerate with order $O(\varepsilon^{2\gamma})$. It is shown that for $\gamma = 0$ and $\gamma = 1$ the error between the original solution and the effective solution is of order $O(\varepsilon^{1/2})$. Therefore suitable test functions are constructed via the periodic unfolding method and a gradient folding operator making only minimal additional assumptions with respect to the macroscopic scale on the given data and the effective solution. In the second part we generalize the obtained error estimates to parabolic equations.