

1015-35-222

Y. Sujeet Bhat* (ybhat@math.ufl.edu), University of Florida, Dept. of Mathematics, P.O. Box 118105, Gainesville, FL 32611-8105. *Homogenization of a nonlinear elliptic boundary value problem modeling galvanic currents.*

We study a nonlinear elliptic boundary value problem arising from electrochemistry in the study of heterogeneous electrode surfaces. The boundary condition is of exponential type (Butler-Volmer) and has a periodic structure. We find a limiting or effective problem as the period approaches zero, along with a first order correction. We establish convergence estimates and provide numerical experiments. (Received February 06, 2006)