

1040-35-161

Iuliana Marchis* (marchis_julianna@yahoo.com), Babes-Bolyai University, Sindicatelor 7, Cluj-Napoca, Romania, and **Jozsef Kolumban**. *On Nonlinear Elliptic PDEs in Some Growing Fractal Domains*. Preliminary report.

Y. Achdou, C. Sabot, and N. Tchou studied the weak solution of the Poisson equation on a self-similar ramified fractal domain Ω of \mathbf{R}^2 with fractal boundary. This domain can be obtained by gluing together shrunk and translated copies of a simple polygonal "T-shaped" domain Y in \mathbf{R}^2 . They solved numerically a boundary value problem in the subdomain ω^n , obtained by interrupting the fractal construction after a finite number of generations. The main goal of this paper is to study the limit behavior of the solution of a more general nonlinear elliptic problem. For this purpose we use the technique of homogenization and reduction of dimension elaborated in the last years by B. Gustafsson, J. Mossino, and P. Courilleau. The main result gives a type of weak convergence (named weakly diagonally L^2 -convergence) of the solution U^n to a function depending only on the first variable, and of the derivative $\frac{\partial U^n(y)}{\partial y_2}$, where both limits are solutions of some variational equations. If we enhance the positivity condition of the involved bilinear functional with a stronger one, we obtain a kind of strong convergence (named diagonally L^2 -convergence) of the solution U^n in $H^1(\Omega)$. (Received January 31, 2008)