Existence, uniqueness and numerical simulation of a renormalized periodic solution to a nonlinear parabolic equation with variable exponent and L_1 data.

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Abstract: Partial differential equations with variable exponents have been extensively studied in recent years. It is an important task which reveals many mathematical problems and attributes in several models. In this presentation, we consider a nonlinear p(x)-Laplacian parabolic equation with L_1 data and periodic condition in the time, for which we prove the existence and uniqueness of a periodic renormalized solution by using new techniques. Finally we present a numerical algorithm based on artificial neural network to simulate the periodic solution of our problem.
Keywords: p(x)−Laplacian, Parabolic Problems, Periodic solution, Variable Exponent, Renormalized Solutions, L_1 Data, Deep Neural Networks