A Perturbation Method for Determination of an Approximate Analytical Solution of a Nonlinear System of ODEs. AUSTIN GABHART, Gatton Academy, Western Kentucky University, Bowling Green, KY 42101

We considered the steady-state (time-independent) solutions of a system of two nonlinear diffusion-type PDEs that model concentrations of carbon atoms and dimers in the course of a growth of two graphene islands on copper by the chemical vapor deposition. Wolfram Mathematica was used to find the approximate solutions for various parameters sets by implementing a perturbation method; next, the full system was solved numerically and the solutions were compared. We found that the maximum values of the concentrations were not always midway between the two islands. We also found that for certain parameters the solutions would concentrate around one value, and on Cu[100] surface the first and second order perturbative solutions for the atom concentration are equivalent.