HOMOGENEOUS STATIONARY SOLUTION TO EPITAXIAL GROWTH MODEL UNDER DIRICHLET CONDITIONS

Somayyeh Azizi and Atsushi Yagi[1]

Received October 2, 2015 ; revised December 9, 2015

Abstract. This paper continues a study on the initial-boundary value problem for a nonlinear parabolic equation of fourth order under the homogeneous Dirichlet boundary conditions. The parabolic equation has been presented by Johnson-Orme-Hunt-Graff-Sudijono-Sauder-Orr [10] in order to describe the large-scale features of a growing crystal surface under molecular beam epitaxy. In the previous papers [1, 2], we constructed a dynamical system generated by the problem and showed that every trajectory converges to some stationary solution as $t \to \infty$. This paper is then devoted to investigating stability or instability of the null solution which is a unique homogeneous stationary solution. We shall also illustrate some numerical results to observe how changes the structure of stationary solutions as the roughening coefficient increases.

Key words and phrases. Epitaxial Growth, Stationary Solutions, Stability and Instability.