

## ON THE LARGE TIME BEHAVIOR OF SOLUTIONS FOR SOME DEGENERATE QUASILINEAR PARABOLIC SYSTEMS

TAKASI SENBA

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### 1. Introduction

We consider the large time behavior of the solutions for the following Cauchy problem:

$$(1.1) \quad \begin{aligned} u_t &= (u^m)_{xx} - v^n u^n & \text{in } \mathbf{R} \times (0, \infty) \\ v_t &= (v^m)_{xx} - u^n v^n & \text{in } \mathbf{R} \times (0, \infty) \end{aligned}$$

with initial conditions

$$(1.2) \quad u(\cdot, 0) = u_0 \text{ and } v(\cdot, 0) = v_0 \text{ on } \mathbf{R}.$$

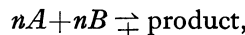
Here,  $m > 1$  and  $n \geq 1$  are real numbers. Throughout this paper, we assume that  $m > 1$  and  $n \geq 1$ .

By [10], the following properties are shown:

When the reaction arises among some reactions, for each reactant the equation for reaction-diffusion takes the form

$$\frac{\partial C}{\partial t} = \operatorname{div} D \operatorname{grad} C + q',$$

where  $C$  is the concentration,  $D$  is the diffusion coefficient and  $q'$  is the amount of material formed through chemical reactions per unit volume per unit time. When a reaction arises among  $n$  molecules of a substance  $A$  and  $n$  molecules of a substance  $B$  and does not reverse, that is to say, when the reaction is written as



then  $q'$  of both equations for  $A$  and  $B$  are proportional to  $-C_A^n C_B^n$ , where  $C_A$  and  $C_B$  are the concentrations of the substances  $A$  and  $B$ , respectively. That is to say, the concentrations  $C_A$  and  $C_B$  satisfy the equation

$$(1.3) \quad \begin{aligned} \frac{\partial C_A}{\partial t} &= \operatorname{div} D_A \operatorname{grad} C_A - k C_A^n C_B^n \\ \frac{\partial C_B}{\partial t} &= \operatorname{div} D_B \operatorname{grad} C_B - k C_A^n C_B^n, \end{aligned}$$