Global weak solution to a generic reaction-diffusion nonlinear parabolic system

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March 3, 2021

Abstract

We consider a new generic reaction-diffusion system, given as the following form: [?]u/[?]t - div(g(—([?]u_σ)—)[?]u)=f(t,x,u,v,[?]v), in Q_T [?]v/[?]t - d_v Δv=p(t,x,u,v,[?]u), in Q_T u(0,.)=u_0, v(0,.)=v_0, in Ω (1) [?]u/[?]η=0, [?]v/[?]η=0, in [?]_T. Where Ω=]0,1[?×]0,1[, Q_T =]0,T [? and T =]0,T [?, (T > 0), η is an outward normal to domain Ω and u_0, v_0 is the image to be processed, x [?]Ω, σ >0, [?]u_σ= u* [?]G_σ and G_σ= 1/[?]2πσ exp(-—x—ˆ2/4σ). In this study we are going to proof that there is a global weak solution to the ptoblem (1), we truncate the system and show that it can be solved by using Schauder fixed point theorem in Banach spaces. Finally by making some estimations, we prove that the solution of the truncated system converge to the solution of the problem.

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