Global asymptotic stability and the ideal free distribution in a starvation driven diffusion ⋆

Yong-Jung Kim[1], **Ohsang Kwon**[2] **and Fang Li**[2]

[1]Department of Mathematical Sciences, KAIST, 291 Daehak-ro, Yuseong-gu, Daejeon 305-701, Korea; E-mail: yongkim@kaist.edu

[2]The Center for Partial Differential Equations, East China Normal University, Shanghai 200241, China; E-mail: ohsangkwon80@gmail.com, fangli0214@gmail.com

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Abstract. We study a logistic model with a nonlinear random diffusion in a Fokker-Planck type law, but not in Fick's law. In the model individuals are assumed to increase their motility if they starve. Any directional information to resource is not assumed in this starvation driven diffusion and individuals disperse in a random walk style strategy. However, the non-uniformity in the motility produces an advection toward surplus resource. Several basic properties of the model are obtained including the global asymptotic stability and the acquisition of the ideal free distribution.

Key words. ecological diffusion, global asymptotic stability, ideal free distribution, starvation induced motility

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