

Partial Hölder Regularity for a Class of Cross-Diffusion Systems with Entropy Structure

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Abstract: We obtain partial $C^{0,\alpha}$ -regularity for bounded solutions of a certain class of cross-diffusion systems, which are strongly coupled, degenerate quasilinear parabolic systems. Under slightly more restrictive assumptions, we obtain partial $C^{1,\alpha}$ -regularity. The cross-diffusion systems that we consider have a formal gradient flow structure, in the sense that they are formally identical to the gradient flow of a convex entropy functional. The main novel tool that we use is a “glued entropy density,” which allows us to emulate the classical theory of partial Hölder regularity for nonlinear parabolic systems. To demonstrate the applicability of our results and motivate our techniques, we consider the two component Shigesada-Kawasaki-Teramoto (SKT) model for population dynamics. This talk is based on a joint work with Marcel Braukhoff and Nicola Zamponi.