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Abstracts of Short Communications and Posters

Section:

10. Partial Differential Equations

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Maximum and comparison principle for anisotropic diffusion
A forward-backward parabolic problem which is used in image enhancement processes is considered. For once continuously differentiable weak solutions, in the multidimensional case, a maximum principle and amplitude a priori estimates are proved. A comparison principle is given, in the one-dimensional case, under special assumptions for the initial profiles which are optimal as counterexamples indicate. Unlike the well-known nonuniqueness result of Lipschitz solutions for forward-backward parabolic equations, we prove uniqueness of the weak (once continuously differentiable) solutions. We show that they exist only locally because of the interior gradient blow-up of the solutions for a finite time. The qualitative properties of the weak solutions are investigated as well. These results are joint work with B. Kawohl.