

ENRICO PRIOLA

**Global Lipschitz regularizing effects for parabolic equations with singular coefficients**

We prove global bounds on the spatial gradient of viscosity solutions to second order linear and nonlinear parabolic Cauchy problems in  $(0, T) \times R^N$ . Our assumptions include the case that the coefficients be both unbounded and with very mild local regularity (possibly weaker than the Dini continuity), the estimates only depending on the parabolicity constant and on the modulus of continuity of coefficients (but not on their  $L^\infty$ -norm). Our proof provides the analytic counterpart to the probabilistic proof used in E. Priola and F. Y. Wang (J. Funct. Anal. 2006) to get this type of gradient estimates in the linear case. We actually extend such estimates to the case of possibly unbounded data and solutions as well as to the case of nonlinear operators of Bellman-Isaacs type. We investigate both the classical regularizing effect (at time  $t > 0$ ) and the possible conservation of Lipschitz regularity from  $t = 0$ , and similarly we prove global Hölder estimates under weaker assumptions on the coefficients. The estimates we prove for unbounded data and solutions seem to be new even in the classical case of linear equations with bounded and Hölder continuous coefficients. Applications to Liouville type theorems are also given. This is a joint work with A. Porretta (Roma “Tor Vergata”).