

Lipschitz estimates by doubling variables and the coupling method

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Abstract

Solutions of the Cauchy problem for the heat equation enjoy a well-known regularizing effect with an explicit global Lipschitz bound $\|Du(t)\|_\infty \leq c\|u_0\|_\infty/\sqrt{t}$. In a joint work with E. Priola, we show the extension of this type of estimate to linear and nonlinear equations (including Bellman- Isaacs equations) with unbounded coefficients satisfying mild continuity assumptions. We use the doubling variables method developed by Ishii and Lions and we point out the equivalence with the so-called coupling method used in the probabilistic approach.