REGULARITY AND NONUNIQUENESS RESULTS FOR PARABOLIC PROBLEMS HAVING NATURAL GROWTH IN THE GRADIENT

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ABSTRACT. In this paper we study the problem

$$\begin{cases} u_t - \Delta u &= \beta(u)|\nabla u|^2 + f(x,t) & \text{in } Q \equiv \Omega \times (0,+\infty) \\ u(x,t) &= 0 & \text{on } \partial\Omega \times (0,+\infty), \\ u(x,0) &= u_0(x) & \text{in } \Omega, \end{cases}$$

where Ω is a bounded regular domain, β is a positive nondecreasing function and f, u_0 are positive functions satisfying some hypotheses of summability. Among others contribution the main one is to prove a *wild* non-uniqueness result.

Key words and phrases. Viscous Hamilton-Jacobi equations, Nonlinear Parabolic Problems, Existence, Uniqueness and nonuniqueness, Regularity of solutions.

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