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Blow-up of solutions of nonlinear Pseudo-Parabolic equations

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Abstract

In this talk, we present the studies about the blow-up of solutions of pseudo-parabolic problems starting from the following equation which was called the first time as a pseudo-parabolic equation by Showalter and Ting in 1970,

$$u_t - \Delta u_t - \nu \Delta u = 0, \ \nu > 0,$$

and represents a subclass of equations of Sobolev type equations. We also analyze the following initial boundary value problem in a bounded domain $\Omega \in \mathbb{R}^n$ and give the sufficient conditions for the blow-up of solutions and the lower and upper bounds for the blow-up time if blow-up happens,

$$u_t - \Delta u_t - \Delta u - u^m u_{x_1} + g(t, x, u, \nabla u) = |u|^{m_1} u, \quad x \in \Omega, \quad t > 0,$$

Key Words: Pseudo-parabolic equation, Sobolev equation, Lower bound, Upper bound.

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