

**ON NECESSARY AND SUFFICIENT
CONDITIONS FOR CLASSICAL SOLVABILITY
OF THE CAUCHY PROBLEM
FOR LINEAR PARABOLIC EQUATIONS**

D. R. Akhmetov

In the first part of the article, we establish a necessary and sufficient condition ensuring classical solvability of the Cauchy problem with zero initial data for uniformly parabolic equations whose coefficients are Hölder continuous and whose right-hand sides possess a local continuity modulus.

In the second part, we find a representation for a classical solution provided that the latter exists. Herewith, the growth of the right-hand side of an equation is arbitrary as $t \rightarrow 0$ and preassigned as $|x| \rightarrow \infty$.

In the last part, we obtain necessary and sufficient conditions for classical solvability of the Cauchy problem with zero initial data for parabolic equations with constant coefficients and right-hand sides infinitely differentiable for $t > 0$.

Key words and phrases: parabolic equations, Cauchy problem, classical solution, necessary and sufficient conditions, Tikhonov function class, Hölder condition, continuity modulus, Dini condition, Duhamel integral.

Akhmetov Denis Robertovich

Sobolev Institute of Mathematics,
630090 Novosibirsk, Russia.
E-mail: adr@math.nsc.ru

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