Golichev, I. I.

Some iterative methods of solving problems for parabolic equations. (English. Russian original)
Zbl 0727.65076
Sov. Math., Dokl. 37, No. 3, 714-717 (1988); translation from Dokl. Akad. Nauk SSSR 300, No. 4, 782-785 (1988).

The iterative process

$$\frac{\partial u_{k+1}}{\partial t} - \alpha\Delta u_{k+1} = \frac{\partial}{\partial x_i}[(A_{ij}(Pu_k) - \alpha\delta_{ij})Q\frac{\partial u_k}{\partial x_i}] - A_0(Pu_k, Qu_{k,k}),$$

$u_{k+1}(x,0) = \psi_0$, $u_{k+1}|_S = \psi_1$, is studied for the problem $\partial u/\partial t - (\partial/\partial x_i)(A_{ij}(u)\partial u/\partial x_j) + A_0(u, u_x) = 0$, $u(x,0) = \psi_0$, $u|_S = \psi_1$, where α is a parameter and P, Q are shear operators. Conditions for convergence are obtained. The author indicates that the iterative process can be applied to proving existence and evaluating some subset of solutions.

MSC:

65M12 Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs
35K15 Initial value problems for second-order parabolic equations

Keywords:

iterative methods; parabolic equations; convergence