$F = F(\beta, R, Z, H)$. Вычислительный алгоритм строится по аналогии с алгоритмом в [1]: конечно-разностная аппроксимация краевой задачи (1)–(2); линеаризация с введением параметра релаксации; рекуррентные расчеты сначала для переменной β, затем для R и Z. В работе осуществлен сравнительный анализ равновесных форм поверхности Γ для различных значений углов контакта.

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Blow-up problem for a parabolic equation with nonlinear memory and absorption under nonlinear nonlocal boundary condition

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We consider nonlinear nonlocal parabolic equation

$$u_t = \Delta u + a\int_0^t u^q(x,\tau)\,d\tau - bu^m,\ x \in \Omega,\ t > 0, \tag{1}$$

with nonlinear nonlocal boundary condition

$$\frac{\partial u(x,t)}{\partial \nu} = \int_\Omega k(x,y,t)u^l(y,t)\,dy,\ x \in \partial\Omega,\ t > 0, \tag{2}$$

and initial datum

$$u(x,0) = u_0(x),\ x \in \Omega, \tag{3}$$

where $a, b,\ q,\ m,\ l$ are positive numbers, Ω is a bounded domain in $\mathbb{R}^N$ for $N \geq 1$ with smooth boundary $\partial\Omega$, ν is unit outward normal on $\partial\Omega$.

Throughout this paper we suppose that the functions $k(x,y,t)$ and $u_0(x)$ satisfy the following conditions:

$$k(x,y,t) \in C(\partial\Omega \times \overline{\Omega} \times [0,+\infty)),\ k(x,y,t) \geq 0;$$

$$u_0(x) \in C^1(\overline{\Omega}),\ u_0(x) \geq 0 \text{ in } \Omega,\ \frac{\partial u_0(x)}{\partial \nu} = \int_\Omega k(x,y,0)u_0^l(y)\,dy \text{ on } \partial\Omega.$$

The initial boundary value problem (1)–(3) with $a = 0$ has been considered in [1, 2].

We prove finite time blow-up results for solutions with large initial data as well the global existence of solutions for any initial data.

The results of the talk will be published in “Lobachevskii Mathematical Journal".

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