with initial conditions $\hat{A}(0) = A_*(0), \quad R(0) = \Theta_n, \quad P(0) = E_n$, where $\gamma(N+1) = \lambda(N) + x^T(N+1)R(N)x(N+1), \delta(N+1) = x^T(N+1)P(N)x(N+1).$

NUMERICAL SIMULATION OF INTERNAL BALLISTICS

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To create a new artillery barrels, shells and charges is necessary to use modern mathematical methods and appropriate software. This applies to problems of both external and internal ballistics. The aim of this work is to develop a numerical algorithm for solving the basic problems of internal ballistics and to simulate pirodynamics processes under different charging conditions.

Projectile movement in the gun barrel accompanied by a variety of processes: mechanical, physical, chemical, thermal and gas-dynamic. The main processes in internal ballistics are: powder combustion, formation of powder gases, expansion of powder gases, the forward movement of the projectile, leaking powder gases from the bore and others. The mathematical model is written as:

$$\psi = \chi z(1 + \lambda z), \tag{1}$$

$$p = fw(\psi - \theta\phi q v^2 / (2fw)) / s / (l_\psi + l), \tag{2}$$

$$\phi q \frac{dv}{dt} = sp, \tag{3}$$

$$\frac{dl}{dt} = v, \tag{4}$$

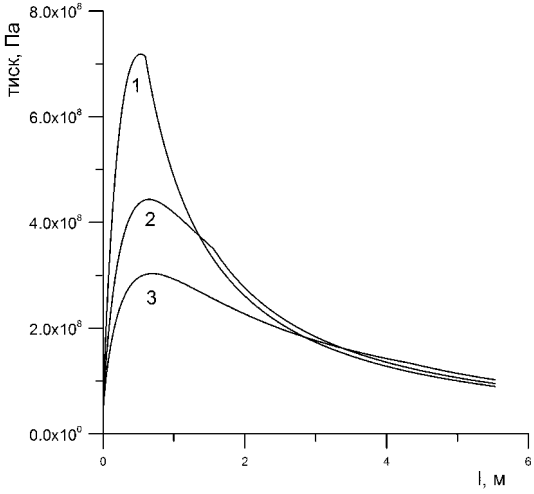
$$\frac{dz}{dt} = \frac{p}{I_k}, \tag{5}$$

$$l_\psi = l_0 \left[1 - \frac{\Delta}{\delta} - (\alpha - \frac{1}{\delta})\Delta\psi \right], \tag{6}$$

Equation (1) - (6) connecting to one another, a path that projectile moves l, velocity v, pressure of propellant gases p, the relative thickness of the propellant gases z and the relative weight of burned gunpowder ψ. Solving of the system begins with the beginning of the projectile movement ($t = 0$). At this moment the forcing pressure p_0 is

set and values ψ_0 and z_0 defined from the first and second equations. The initial conditions for differential equations (3) - (5) is: $v = 0,\ l = 0,\ z = z_0$.

The system of differential equations solved by Kutt-Merson method.



To analyse the calculations and their comparison with the calculations with internal ballistics tables we conclude that the design ballistic artillery systems must use a mathematical model and appropriate software rather than internal ballistics tables.

Computational experiments for strip pirokselin powder with different tape thickness. The figure shows graphs of powder gases pressure versus position of the projectile in the barrel during firing to different thicknesses powder tapes (1 - strip thickness of 1.5 mm, 2 - 2 mm 3 - 2.5 mm).

ON OPTIMIZATION OF A CAPITAL GROWTH RATE FOR INSURANCE COMPANY

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The problem of maximization of the average growth rate of capital of insurance company with restrictions on the ruin probability is considered. It is assumed that the insurance company buys a surplus reinsurance contract to avoid ruin.

Let the insurance company undertakes n types of insurance contracts and the number of claims of type i in the time interval $(0;t)$ follows a Poisson distribution with the parameter $\lambda_i t$, $i = \overline{1,n}$. In [1] it