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Nonlinear problems with functional initial conditions and its applications

The report is devoted to investigations of nonlinear problems with functional initial conditions and determination of its solutions. It is also considered its applications in the field of ecology, economics, hydromechanics and so on. In these problems, the initial condition of Cauchy type is replaced by the initial condition of functional type. For example, the problem of finding the solution of ordinary differential equations

$$\dot{x} = f(x, \tau),\ 0 < \tau < L \text{ with } x(0) = \int_0^L \phi(x(\xi), \xi)\, d\xi$$

is an example of such problems. Here $f(\cdot), \phi(\cdot)$ are given function, L is given number.

In this work we shall investigate nonlinear problems with differential operator of type:

$$\frac{\partial}{\partial t} + \frac{\partial}{\partial a} + \sum_i \left[V_i \frac{\partial}{\partial x_i} - \frac{\partial}{\partial x_i} \left(D_i \frac{\partial}{\partial x_i} \right) \right]$$

and corresponding initial, functional initial, boundary conditions. Here V_i and D_i are given matrices, t is time, a is an age, x_i are spaces coordinates.

References

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