

REVIEW

for the final qualifying work of a PhD student
St. Petersburg State University
Saakyan Artur Temievich

«Construct schemes for speeding up of numerical integration of differential equations»

In the final qualifying work, the problem of optimizing the computation of a system of monomials in many variables is considered: the total number of sequentially organized multiplications is optimized, such that at the end of the computations, all monomials of the original system are found.

The problem of optimizing the computation of a system of monomials turns out to be relevant in solving many problems of applied mathematics. The author of the final qualifying work connects the problem of optimizing the computation of a system of monomials with the problems of step-by-step numerical integration of ordinary differential equations of Dynamics by methods such as the methods of Runge-Kutta, Adams, the method of Taylor series, etc.

Indeed, by introducing additional variables, a large number of differential equations of dynamics are reduced to systems of ordinary differential equations with polynomial right-hand sides in unknowns. This means that at each step of the step-by-step methods mentioned above, you will have to calculate a large number of different monomials in many variables.

The author solves the posed minimization problem by reducing it to a linear programming problem. He solved this problem for systems of monomials of arbitrary degree. He compiled and debugged a program for constructing such schemes.

As the main examples, he considered equations in Cartesian coordinates for the classical N-body problem, reducing them to equations with polynomial right-hand sides of the fifth, fourth and third degrees.

In my opinion, the final qualifying work of Saakyan Artur Temievich **«Construct schemes for speeding up of numerical integration of differential equations»** deserves an “**excellent**” mark.

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