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Research on the Efficiency of Parallel Computations in Relaxation Methods for the Analysis of Dynamic Systems

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Abstract—Peculiarities of the use of parallel computing for the analysis of dynamic systems are studied using the example of the Lotka-Volterra "predator-prey" model. Such relaxation methods as the Jacobi, Gauss-Seidel, SOR and their parallel implementations using Python libraries are considered. The analysis of the efficiency and accuracy of these methods, and the influence of the model parameters on the calculation results, was carried out. A graphical interface for visualization and study of population dynamics has been developed. The obtained results show the potential of parallel computing to accelerate and improve the accuracy of modeling dynamic systems.

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