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The Method of Decomposition in Invariant Structures: Exact Solutions for *N* Internal Waves in Three Dimensions VICTOR MIROSHNIKOV, CMSV, Department of Mathematics, New York — The Navier-Stokes system of PDEs is reduced to a system of the vorticity, continuity, Helmholtz, and Lamb-Helmholtz PDEs. The periodic Dirichlet problems are formulated for conservative internal waves vanishing at infinity in upper and lower domains. Stationary kinematic Fourier (SKF) structures, stationary kinematic Euler-Fourier (SKEF) structures, stationary dynamic Euler-Fourier (SDEF) structures, and SKEF-SDEF structures of three spatial variables and time are constructed to consider kinematic and dynamic problems of the three-dimensional theory of the Newtonian flows with harmonic velocity. Exact solutions for propagation and interaction of N internal waves in the upper and lower domains are developed by the method of decomposition in invariant structures and implemented through experimental and theoretical programming in Maple. Main results are summarized in a global existence theorem for the strong solutions. The SKEF, SDEF, and SKEF-SDEF structures of the cumulative flows are visualized by two-parametric surface plots for six fluid-dynamic variables.

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