

# Solving high-linear dynamic problems using fixed meshes in LOGOS software package

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The paper describes the functionality of the LOGOS-Mechanical [1] software module, which is part of the multifunctional domestic LOGOS [2] software package, in terms of solving high-nonlinear dynamic strength problems using fixed unstructured meshes.

In the LOGOS-Mechanical software module, when computing gas-dynamic and elastoplastic currents, splitting into Lagrangian and Euler stages is used. At the Lagrangian stage, mesh nodes move with matter and with intense currents, the quality of the mesh can noticeably deteriorate. To maintain acceptable mesh properties, a Euler stage is completed, which consists of a procedure for adjusting the mesh and recalculating the values from the Lagrangian mesh to the corrected one. If the mesh returns to its initial position during the correction step, the mesh is stationary.

The paper describes the functionality of the LOGOS software package in terms of solving high-nonlinear dynamic strength problems using fixed unstructured meshes, methods for constructing a fixed unstructured mesh, features of methods and algorithms of numerical simulation at the Lagrangian and Eulerian stages, as well as principles of parallelization.

Finally, we provide the results of several computations using fixed meshes in LOGOS-Mechanical computational module.

[1] Dyanov D 2018 *VANT. Ser.: Mat. Mod. Phys. Proc.* 3–14

[2] LOGOS software package <http://logos.vniief.ru/products/logos>