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Numerical Modeling of Large Scale Dam Break Flows

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Abstract : The work presents the results of mathematical modeling of large-scale flows in areas with a complex topographic relief. The Reynolds-averaged Navier—Stokes equations constitute the basis of the three-dimensional unsteady modeling. The well-known Volume of Fluid method implemented in the solver interFoam of the open package OpenFOAM 2.3 is used to track the free-boundary location. The mathematical model adequacy is checked by comparing with experimental data. The efficiency of the applied technology is illustrated by the example of modeling the breakthrough of the dams of the Andijan (Uzbekistan) and Papan (near the Osh town, Kyrgyzstan) reservoir.

Keywords : three-dimensional modeling, free boundary, the volume-of-fluid method, dam break, flood, OpenFOAM
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