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ANALYTICAL SOLUTION OF PROBLEM ON FALL OF SPHERE THE RADIUS OF WHICH DECREASES FROM LINEAR-FRACTIONAL LAW

The paper deals with building a mathematical model of motion of the sphere with variable radius and mass. The analytical method for solving the Cauchy problem for a nonlinear equation of motion with variable coefficients is the research method. For the first time a closed analytic solution of a nonlinear differential equation of a vertical fall of a spherical variable-mass body is built in cylindrical functions when its radius is reduced fractionally and linearly in time and quadratic resistance of the air environment. The asymptotic behavior of solutions is investigated.

Keywords: variable-mass sphere, aerodynamic resistance, Riccati equation, vertical displacement of Bessel function.

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