The Solution of the Inverse Boundary Value Problem for a Wing Profile, Located Close to Rectilinear Screen, in a New Setting

R. B. Salimov

Rasih B. Salimov, https://orcid.org/0000-0002-4717-3676, Kazan State Architecture and Building University, 1, Zelenaya Str., Kazan, 420043, Russia, salimov.rsb@gmail.com

The paper shows the inverse boundary value problem for the airfoil located near the solid rectilinear boundary and streamlined by a potential flow of the incompressible inviscid fluid with speed parallel to the boundary, when we need to find a form and a position of the airfoil by a given distribution of speed potential as a function of the ordinates of the points of the profile on the small part of ones, containing a leading edge, and as a function with the second order pole, then the abscissa of the point of the profile on the rest and by the given difference of values of the current function on the profile and on the rectilinear boundary (or the values associated with the known difference). The problem is reduced to the mixed boundary value problem for function analytic in the annulus with the second-order pole, then the problem is narrowed to the Hilbert boundary problem for the single-valued analytic function in the annulus with linear boundary condition which connects the real and the imaginary parts of the function. The solution of the final problem is based on developed methods with the use of Ville formulas, then it will be possible to define a single-valued analytic function in the annulus by the known boundary conditions of the real part. given boundary values of its real part.

Key words: inverse boundary problem, aerohydrodynamics, wing profile, incompressible inviscid fluid, complex potential.

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