

Handbook of Research on

Computational Simulation and Modeling in Engineering



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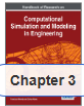
Handbook of Research on Computational Simulation and Modeling in Engineering 1st Edition

by [Francisco Miranda](#) (Editor), [Carlos Abreu](#) (Editor)

Multiple disciplines depend on computer programs and software to predict project challenges, outcomes, and solutions. Through the use of virtual prototyping, researchers and professionals are better able to analyze data and improve projects without direct experimentation, which can be costly or dangerous. The Handbook of Research on Computational Simulation and Modeling in Engineering is an authoritative reference source on the computer models and technologies necessary to enhance engineering structures and planning for real-world applications. This publication is an essential resource for academicians, researchers, advanced-level students, technology developers, and engineers interested in the advancements taking place at the intersection of computer technology and the physical sciences. This publication features chapters on the advanced technologies developed within the field of engineering including prediction tools, software programs, algorithms, and theoretical and computational models.

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As that indicated by gusts and lulls in the wind.

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Kulyash Kaliyeva (Lorraine University, France)

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Abstract

This chapter presents convergent-divergent flow in the free atmosphere which is governed by the three dimensional Navier-Stokes equations and deals with the fundamental problem of fluid dynamics. Considering air movement under influence divergence and rotation were found the true dependencies between the velocity vector and the pressure distribution. Following the classical procedure by using rotor operator and a well-known formula of vector analysis were obtained the second kind nonlinear Volterra-Fredholm integral equations in a matrix form which contained only three components of the velocity vector. According to the theory of the matrix operators were defined the velocity components by the successive approximation method. According to the obtained balance equation for the pressure distribution were defined significant properties of the transient convergent-divergent flow which provide a description of the constitutive relationships between three physical quantities: the velocity vector, the external and internal forces, the pressure distribution.

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