Methodological basis for CFD calculations to support pneumatichydraulic systems designing

© O.V. Belova¹, V.Yu. Volkov², A.P. Skibin³, A.V. Nickolaeva³, A.A. Krutikov³, A.V. Chernyshev¹

¹ Bauman Moscow State Technical University, Moscow, 105005, Russia ² OJSC "VNIIAES", Moscow, 141980, Russia

³ OKB "GIDROPRESS", Moscow region, Podolsk, 142103, Russia

The authors suggest general methods for numerical studies in the field of fluid dynamics and heat and mass transfer. These methods are widely used in all branches of industry, especially in aerospace, automotive, energy, oil and gas. However, the application of these methods without special methodology can result in false results, which can be followed by very serious consequences. It can explain a very limited application of numerical methods, for example, in the nuclear industry and in the enterprises of the military-industrial complex. At the same time, the application of the mentioned methodology that has been tested for a wide range of applications, allows to obtain reliable results and define the required parameters of the object to study with the required accuracy and at reasonable time expenditure concurrently.

Keywords: calculation method, CFD, pneumatic-hydraulic system.

Belova O.V. (b. 1971) graduated from Bauman Moscow State Technical University in 1995. Ph.D., Assoc. Professor of the Vacuum and Compressor Equipment Department of Bauman Moscow State Technical University. Author of more than 20 publications in field of computer simulation and engineering systems. e-mail: ovbelova@yandex.ru

Volkov V.Yu. (b. 1989) graduated from Bauman Moscow State Technical University in 2012. Engineer of the OJSC "VNIIAES". Specializes in the field of computational fluid dynamics and heat and mass exchange.

Skibin A.P. (b. 1963) graduated from Bauman Moscow Higher Technical School in 1986 and Lomonosov Moscow State University in 1988. Ph.D., Head of the Group in the OKB "GIDROPRESS". Author of more than 80 publications in the field of computational fluid dynamics and heat and mass transfer. e-mail: askibin@yandex.ru

Nikolaeva A.V. (b. 1986) graduated from the Moscow Power Engineering Institute (Technical University) in 2009. Ph.D., Design-engineer of the OKB "GIDROPRESS". Author of 20 publications and of the 3 inventions Russian Federation.

Krutikov A.A. (b. 1981) graduated from Bauman Moscow State Technical University in 2004. Ph.D., Design-engineer of the OKB "GIDROPRESS". Author of more than 20 publications in the field of computer simulation and study of working processes in elements of pneumatic hydraulic systems.

Chernyshev A.V. (b. 1952) graduated from Bauman Moscow Higher Technical School. Dr. Sci. (Eng.), Professor of the Vacuum and Compressor Equipment Department of Bauman Moscow State Technical University. Author of more than 100 publications in the field of mathematical simulation and study of working processes, develop-ment and design of vacuum and electropneumatic different-purpose equipment. e-mail: av-chernyshev@yandex.ru