On the physical meaning of Reynolds number and other criteria of hydrodynamic similarity

© K.A. Makarov

Bauman Moscow State Technical University, Moscow, 105005, Russia

The paper considers physical interpretation of Reynolds number as the ratio of momentum flux of fluid enclosed in the volume of a unit length along the flux towards the viscous friction force per unit length along the flux. Within such interpretation there is no contradiction between the "energy" and "power" interpretations of the physical meaning of Reynolds number. The study justifies logical correctness of this interpretation and investigates the physical meaning of the other parameters of the hydrodynamic similarity.

Keywords*: hydrodynamic similarity, Reynolds number, Froude number, Newton number, Euler number.*

REFERENCES

[1] Zinov'evA.A. *Logicheskiy intellect* [Logical intelligence]. Moscow, Moscow State Humanitarian Univ. Publ., 2005, 284 p.

[2] Zinov'evA.A. *Ocherki kompleksnoi logiki* [Outlines of complex logic]. Moscow, Editorial URSS Publ., 2000, 560 p.

[3] Kochin N.E., Kibel' I.A., Roze N.V. *Teoreticheskaya gidromekhanika* [Theoretical hydromechanics], part 2. Moscow, Fizmatgiz Publ., 1963, 728 p.

[4] Miln-Tomson L.M. *Teoreticheskaya gidrodinamika* [Theoretical hydrodynamics]. Moscow, Mir Publ., 1964, 655 p.

[5] Loitsianskiy L.G. *Mekhanika zhidkosti i gaza* [Fluid and gas mechanics]. Moscow, Nauka Publ., Chief edit. board of phys.-math. lit., 1970, 904 p.

[6] Bashta T.M., Rudnev S.S., Nekrasov B.B., Baibakov O.V., Kirillovskiy Yu.L. *Gidravlika, gidravlicheskie mashiny i gidravlicheskie privody* [Hydraulics, hydraulic machines and hydraulic actuators]. Moscow, Mashinostroenie Publ., 1970, 504 p.

Makarov K.A., PhD, Assoc. Professor of the Department of Hydromechanics and Cybernetic Hydropneumatic Systems at Bauman Moscow State Technical University. e-mail: kmakarov@list.ru