Stationary flow of a viscous liquid in a flat channel with permeable walls

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The article considers the problem of stationary blood flow in vessels with permeable walls. To determine the hydraulic resistance in an arterial vessel, the blood is considered Newtonian viscous fluid, and the flow is stationary. When solving problems, formulas were obtained for determining the corresponding hydrodynamic parameters, such as speed, fluid flow rate and pressure gradient. The impedance method is determined by the hydraulic resistance. In a stationary flow, the hydraulic resistance in the permeable vessel substantially depends on the permeability coefficient: with an increase in this coefficient, it decreases.

References

1. Agiev R.V., Kuznetsova E.L., Kulikov N.I., Mogilevich L.I., Popov V.S. A mathematical model of a pulsating layer of viscous fluid in a channel with an elastic wall // Bulletin of PNIPU, mechanics, 2014, No. 3. - S. 17-35.
2. Bogachenko S.E., Ustinov Yu.A. The model of blood movement in the arterial vessel during systole and the analysis of the stress state of the wall taking into account helical anisotropy // Russian Journal of Biomechanics, 2009, Volume 13, No. 1. - S. 29-42.
3. Batishchev A.E., Petrovskaya D.S., Ustinov Yu.A. Modeling of spiral waves in the aorta // Russian Journal of Biomechanics, 2013, V.17, No. 1 (59). - S. 55-63.
4. Valueva E.P., Popov V.N. Mathematical modeling of pulsating turbulent fluid flow in a round pipe // DAN RF 1993, V.332, No. 1. - S. 44-47.
5. Valueva E.P., Pudin M.S. Hydrodynamics and heat transfer of a pulsating laminar flow in channels // Thermal Engineering, 2015, No. 9. - S. 24-33.
6. Valueva E.P., Pudin M.S. Pulsating laminar flow in a rectangular channel // Thermophysics and Aeromechanics, 2015. - P. 761-773.
7. Verveyko N.D., Sumets P.P., Voronkov A.A. A mathematical model of the pulse movement of blood in the vessels // Bulletin of Voronezh State University, a series of physics, mathematics. 2003, No. 2. - S. 125-131.
8. Navruzov K., Razhabov S., Shukurov Z. The impedance method for determining hydraulic resistance in large arterial vessels with permeable walls // Ilm sarchashmalari, 2017, No. 4. - S. 12-13.
9. Navruzov K., Razhabov S., Shukurov Z. On the pulsating flow in large arterial vessels, taking into account the elasticity of the wall // Ilm sarchashmalari, 2017, No. 11. - S. 31-37.
10. Navruzov K., Razhabov S.Kh., Shukurov Z.K. The impedance method for determining hydraulic resistance in large arterial vessels with permeable walls // Uzb. journal Problems of mechanics. - 2017, No. 3-4. - S. 28-32.
11. Razhabov S.Kh., Shukurov Z.K. Pulsating fluid flows in pipes with permeable walls // Science, research, development * 13 Techics and technology. Berlin - 2019. B.C. 94, Z 40, (01.30.2019) - Warszawa - 2019. - 208 p.
12. Pedley T. Hydrodynamics of large blood vessels. - M.: Mir, 1983 .-- 400 p.
13. Rubenstein D. A., Wti Yin and Mary D. Frame. Biofluid mechanics. Stony brook, NY, USA, Second edition 2015, ISBN: 978-0-12-800944-4 (www.elsevier.com, www.bookaid.org).
14. Navruzov K.N., Rajabov S.X., Shukurov Z.K., Begjanov A., Babajonova Y. On the reduction of the resistance in the central arterial vessel // Asian Journal of Research. - No. 12 (12), 2017. - P. 30-31.

15. Razhabov S.Kh., Shukurov Z.K. Pulsating fluid flows in pipes with permeable walls // Science, research, development * 13 Techics and technology. Berlin - 2019. B.C. 94, Z 40, (01.30.2019) - Warszawa - 2019. - 208 p.