List of questions for the examination on Advanced gas dynamics course (spring 2018)

1. Mass, momentum and energy conservation laws [1]
2. Complete system of equations for compressible gas flows [1]
3. Blade machines (turbines and compressors) [1]
4. General properties of first order PDE characteristics with two independent variables [1]
5. Two-dimensional acoustics waves (plane, cylindrical and spherical) [1]
6. 2D steady flows: governing equations and first integrals [1]
7. Stream function and vorticity in 2D steady flows [1]
8. Characteristics of 2D steady flows [1]
9. Supersonic flow past a cone. Apple curve [1]
10. Flows past a slender body. Equation and boundary conditions for potential (linear theory) [2]
11. Similarity rules for plane and axissymetric slender body flows: Prandtl-Glauert and Goethert rules [2]
12. Flow past a slender cone [2]
13. Flow past a wavy wall. Wave drag [2]
14. Hypersonic flow past a sphere. Distance between bow shock and the sphere
15. Cherny method for hypersonic flows past a blunt bodies [3]
16. Shock wave structure [4]
17. Non-equilibrium effects for diatomic gases. "Frozen"flows. [5]
18. Non-equilibrium effects in nozzle flows, method of sudden freezing sudden freezing [5]
19. Gas-vapor mixture flow. Nucleation theory. [6, 7]
20. Combustion front stability [8]

Список литературы

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[2] *Liepmann H.W., Roshko A.* Elements of Gas Dynamics Dover Publications, 1957 =Г. В. Липман, А. Рошко Элементы газовой динамики. Пер. с англ. М.: 1960. 520 с.

[3] Г.Г. Черный Течения газа с большой сверхзвуковой скоростью М.:1959

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