## Note Concerning our Paper "On the Nature of Turbulence"

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After the paper referred to in the title was published, references to the relevant Russian literature were made available to us by Ya. G. Sinai and V. I. Arnold. From these it appears that much of the work on bifurcation described in our paper duplicates results already published by Russian authors. On the other hand the mathematical interpretation which we give of turbulence seems to remain our own responsability!

We thank Sinai and Arnold for informing us of the Russian references. The following list has been compiled from their indications.

- Brušlinskaja, N.N.: Qualitative integration of a system of *n* differential equations in a region containing a singular point and a limit cycle. Dokl. Akad. Nauk SSSR **139** N1, 9—12 (1961); Soviet Math. Dokl. **2**, 845—848 (1961). MR 26, No. 5212; Errata MR 30, p. 1203.
- Limit cycles for equations of motion of a rigid body and Galerkin's equations for hydrodynamics. Dokl. Akad. Nauk SSSR 157, N5, 1017—1020 (1964); Soviet Math. Dokl. 5, 1051—1054 (1964). MR 29, No. 6133.
- The behavior of solutions of the equations of hydrodynamics when the Reynolds number passes through a critical value. Dokl. Akad. Nauk SSSR 162 N 4, 731—734 (1965);—Soviet Math. Dokl. 6, 724—728 (1965). MR 31, No. 6460.
- On the generation of periodic flows and tori from laminar flows, p. 57—79 in Nekotorje voprosy mehaniki gornych porod (some problems of mechanics of minerals), Trudy gornogo instituta, Moscow, 1968.
- Gurtovnik, A.S., Nemark, Ju. I.: On the question of the stability of quasi-periodic motions. Diff. Uravn. 5 N 5, 824—832 (1969).
- Neĭmark, Ju. I.: On some cases of dependence of periodic solutions on parameters. Dokl. Akad. Nauk SSSR 129 N4, 736—739 (1959).
- Motions close to doubly-asymptotic motion. Dokl. Akad. Nauk SSSR 172 N5, 1021—1024 (1967);
  Soviet Math. Dokl. 8, 228—231 (1967). MR 38, No. 669.
- Izv. Vysš. Učebn. Zav., Radiofizika 1 N5—6 (1958); 2 N3 (1959); 8 N3 (1965); 10 N3 (1967).
- Judovič, V.I.: An example of the generation of a secondary or periodic flow due to the loss of stability of a laminar flow of a viscous incompressible fluid. Prikl. Mat. Meh. 29 N3, 453—467 (1965); J. Appl. Math. Mech. 29, 527—544 (1965).
- On the bifurcation of rotationary flows of fluids. Dokl. Akad. Nauk SSSR 169 N2, 306—309 (1966).

- Judovič, V.I.: An example of loss of stability and generation of a secondary flow in a closed volume. Mat. Sbornik 74 (116) N 4, 565—579 (1967).
- Generation of secondary stationary and periodic solutions by destabilization of a stable stationary flow of fluid. Abstracts of short scientific communications, Sec. 12. Internat. Congress of Math. (Moscow, 1966). Mir, Moscow, 1968.
- Questions of the mathematical theory of stability of flows of fluids. Vsesojusnyi siesd po teoretičeskoi i prikladnoi mehanike. Moscow: Annotacii Dokladov 1968.
- On the stability of forced oscillations of fluid. Dokl. Akad. Nauk SSSR 195 N2, 292—295 (1970);
  Soviet Math. Dokl. 11, 1473—1477 (1970).
- Appearance of self-oscillations in fluids, I. Prikl. Mat. Meh., 1971.

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