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Analytical investigation of the flow near rotating disk in Reynolds number region close to turbulence onset using attractor and matrix decomposition methods

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Flow near rotating disk [1] is studied in this work. This flow is similar to flow past a concave wall and flow between coaxial cylinders to some extent [2,3,4]. This fact allows using similar methods to describe and study the system. The set of ordinary differential equations is obtained from Navier-Stokes and continuity equations in Reynolds number's region close to turbulence onset for variables, determining temporal behavior of velocity field of this flow. This set obtained on the basis of Galerkin's method is complicated enough. Then the analysis of the system is carried out with usage of matrix decomposition [4,5]. Only linear and quadratic terms are presented in the decomposition of vector function that determines temporal dependences of phase space variables of the system under investigation. The results obtained can be also used for studding of spherical Couette-Taylor flow [1,6] when regarding rotation axis area.

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