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2. Denomination
Improving methods of secondary jets analysis inside of powerplants' pipes and channels internal flows
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<p>The thesis is devoted to the structure of dust-laden flows in the channels and pipes of the industrial heat power equipment. The equation describing secondary flows in ducts is proposed, which represents the equation of standing waves of vorticity. This allowed using a unified approach to obtain mathematical models of secondary flows in ducts and pipes of arbitrary, round and circular cross-section. The model of the turbulent wall flow structure is developed which accounts for the successive growth of turbulent vortices with the increasing distance from the wall. The model allows to determine the frequency range of turbulent pulsations in the turbulent boundary layer and in the turbulent flow in a round pipe. A vortex-wall interaction is considered and formula obtained for the attraction force acting between the vortex and the wall. An ingenious algorithm for computer visualization is proposed to build the streamlines for the two-dimensional flows of incompressible fluid. This algorithm is used throughout the thesis.</p> <p>A method is proposed to calculate dust particles movement in gas flows, which uses the above-mentioned mathematical models of secondary flows. The trajectories of the particles are obtained for the cases of the flow in a duct with the square cross-section and in a whirling flow in a round pipe.</p> <p>Key words: dust-laden flows, secondary flows, mathematical models, coherent structures, turbulent vortices, computer visualization, calculation of the particles trajectories.</p>