

Abstract in English

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Rolling turbine is a small hydraulic turbine invented by Doc. Ing. Miroslav Sedláček CSc. in 1998. This turbine is bladeless, exhibits various interesting behaviour and operates on the basis of a yet unknown hydraulic principle. This thesis attempts to find an explanation using incompressible Navier-Stokes equations. We will introduce the concept of drag inversion - the idea that fluid force in rolling turbines is a positive feedback to the motion itself. This is explained in a simplified model using analytical methods. These results are then verified in a numerical simulation.