Optimal Flow over Body at Reynolds Great Numbers

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The power optimization problem of a body movement in a viscous medium at Reynolds great numbers is considered. Control forces for body motion from initial position to a given are required to be found. The case of great Reynolds numbers means transformation from stationary laminar flow to unstable flow in relation to small perturbations. In boundary layer flow over a body after a certain length of flow a laminar boundary layer become unstable. Instability at first arises in trace on some distance behind body and leads to slow fluctuations of trace of approximately sinusoidal form and then it comes nearer to body in the form of stationary vortex. These changes in the flow field are lead to changes of full drag force that is considered in the received equations of movement. Problem in view: to find the control forces to transpose the body for the given time with minimal expenses of energy on overcoming of drag force. Such problem is non-regular and its reduction to equivalent problem of non-smooth optimization therefore is offered.

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