# The Stokes system: Reynolds, Strouhal, Block diagonalization. I

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**Abstract.** The main goal of this talk is to better understand a stability result for stationary solutions to the $2D$-Navier-Stokes equation in bounded domains obtained by Ol'ga Aleksandrovna Ladyzhenskaya. In the first introductory part of the talk, I will provide a qualitative spectral analysis of the linearized Stokes block-operator associated with a steady-state solution. In particular, I will show that the rotation angle between the positive subspaces of the Stokes block-operator and its diagonal part can be bounded via the familiar (generalized) Reynolds number. In the second, more formal part of the talk, I will review recent results on block diagonalization of unbounded symmetric forms and explain how the Stokes operator can be block diagonalized.

This is a joint work with L. Grubišić, V. Kostrykin, S. Schmitz and K. Veselić.