Computational modeling of memory effects in turbulent flows

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Numerous examples suggest that the Navier-Stokes equations $\mathbf{div}\ v = 0$, $dv/dt = \triangle v - \mathbf{grad}\ p + f$, where d/dt stands for total time derivative, is unable to govern the phenomenon of turbulence. There is observed on experiment the development of a turbulence, whereas on a sheet of paper the corresponding initial-boundary value problem posses smooth (regular), unique and stable to a reasonable perturbations of data, solution. So that the turbulization of a flow might not be ascribed to any experimental errors whatsoever. On the other hand, the infinite chain of Reynolds equations with averaged velocity of a flow being expressed through double correlation functions of random pulsations, double correlation functions – through triple correlation functions and so on, is believed by many to be capable of describing turbulence. We propose the way of **exact** splitting of Reynolds equations and treat the turbulence of a fluid flow as a two phase hydrodynamical system. The title of the talk reads: "Computational modeling ..." In fact, our research involves some ideas and methods of numerical analysis, rather than the usage of computer itself.