

## Chaotic Stirring of Passive Fluid by a Vortex Pair in Circular Domain

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The advection problem of a passive fluid in 2D velocity field induced by two point vortex pair in an inviscid incompressible fluid inside a circular domain is considered. It is shown that the motion of fluid particles can demonstrate chaotic properties which result under certain initial conditions in an intensive stirring regime. Various criteria and methods were proposed in order to identify these regions, including: an analysis of phase trajectories, spectral and correlation analyses, construction of Poincaré sections, calculation of largest Lyapunov exponents. Some additional criteria are offered, namely: definition of the changes of length of border of investigated contours in time, analysis local stretching maps of passive contours and some statistical methods adapted to 2D fluid flows. Comparative analysis of various stirring criteria and methods in a velocity field induced by two and three point vortices in a circular domain is presented.

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