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New Lagrangian tools for describing transport in aperiodic time dependent flows: a case study of the Kuroshio current[1] ANA M. MANCHO, CAROLINA MENDOZA, ICMAT, CSIC — In recent years there has been a lot of progress in the application of dynamical systems concepts to the description of transport in oceanic flows. In these flows the classical dynamical system theory does not apply since they are aperiodic and finite-time defined. Recently, for describing these flows a new definition of distinguished trajectory has been proposed (Madrid & Mancho, Chaos, 2009). Distinguished trajectories act as organizing centres of the geometrical template of aperiodic time-dependent flows, like fixed points and periodic orbits do in time independent or periodic flows. The computation of distinguished trajectories makes use of a function M of which we show contains a lot of Lagrangian information. In this presentation I will discuss how the visualization of this function M, allows identifying relevant Lagrangian features at a glance. In particular we report an application to real altimetry data taken from satellite in the area of the Kuroshio current. The function M also determines the stable and unstable subspaces of the distinguished hyperbolic trajectories which are tangent to the invariant manifolds. From the computation of stable and unstable manifolds we report an accurate description of transport routes in this region.

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