Rigorous numerics of dynamical systems with strong expansion

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In the talk we will present a new rigorous algorithm for finding chaotic invariant sets of time dependent, periodic ordinary differential equations. The algorithm consists in finding a sufficiently good lower estimate of the exit set of an isolating block and transfering the homology generators through the estimate of the exit set. Unlike other algorithms of this type it does not require the integration of the differential equation. Instead, only some conditions concerning the behaviour of the vector field generating the equation along some hyperplanes are verified by means of interval arithmetic. This makes the approach particularly powerful in the case of differential equations with very strong expansion. A concrete example for which the other numerical schemes break down will be presented.