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Heisenberg spectral cycles for flows

The annihilation and creation operators x+d/dx, x-d/dx, assemble to an even spectral triple over the crossed product of the C*-algebra A of bounded uniformly continuous functions on the real line, by the real line as a discrete topological group. Taking a single orbit of a smooth (ergodic) flow on a compact manifold determines, by restricting functions to the orbit, a C*-subalgebra of A and, taking into account the spectral triple, one gets an example of a 'Noncommutative Geometry' in the sense of A. Connes, associated to the flow. I will discuss application of the Local Index Formula to this situation, with especial attention to the analytic zeta function associated to the spectral triple. The meromorphic extension problem and pole structure of this zeta function turns out to be related to certain delicate points in the study of ergodic time averages. Krönecker flow on the 2-torus already illustrates this in an interesting way, as we will briefly explain.