MR0237903 (38 #6180) 34.65
Katok, A. B. [Katok, Anatole B.]
Spectral properties of dynamical systems with an integral invariant on the torus. (Russian)
Funkcional. Anal. i Priložen. 1 1967 no. 4 46–56

The author considers a system of differential equations on the two-dimensional torus, $dx/dt = A(x, y)$, $dy/dt = B(x, y)$, having an integral invariant $d\mu = F(x, y)dxdy$. He assumes that $A, B, F \in C^5$ and that the rotation number is irrational. Under these conditions he proves that, for the one-parameter group of unitary operators $\{u_t\}$ generated by translations along the trajectories, (1) the spectrum is simple, (2) the maximal spectral type is singular, and (3) the flow has no intermixing. The proof is based on the technique of approximation of a dynamical system by periodic ones, which was developed by V. I. Oseledec, A. M. Stepin and the author [cf. the author, Funkcional. Anal. i Priložen. 1 (1967), no. 1, 75–85; MR0207962].

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