

Ulam method for the Chirikov standard map

Klaus M. Frahm, Dima L. Shepelyansky

(Submitted on 8 Apr 2010 (v1), last revised 20 May 2010 (this version, v2))

We introduce a generalized Ulam method and apply it to symplectic dynamical maps with a divided phase space. Our extensive numerical studies based on the Arnoldi method show that the Ulam approximant of the Perron-Frobenius operator on a chaotic component converges to a continuous limit. Typically, in this regime the spectrum of relaxation modes is characterized by a power law decay for small relaxation rates. Our numerical data show that the exponent of this decay is approximately equal to the exponent of Poincaré recurrences in such systems. The eigenmodes show links with trajectories sticking around stability islands.

Comments: 13 pages, 13 figures, high resolution figures available at: [this http URL](#)
minor corrections in text and fig. 12 and revised discussion

Subjects: **Chaotic Dynamics (nlin.CD)**; Statistical Mechanics (cond-mat.stat-mech)

Cite as: [arXiv:1004.1349v2](#) [nlin.CD]

Submission history

From: Klaus Frahm [[view email](#)]

[v1] Thu, 8 Apr 2010 14:27:02 GMT (1774kb,D)

[v2] Thu, 20 May 2010 14:03:23 GMT (1775kb,D)

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