

Chaotic Maps, Hamiltonian Flows, and Holographic Methods

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(Submitted on 31 Jan 2010 (v1), last revised 8 Feb 2010 (this version, v2))

Holographic functional methods are introduced as probes of discrete time-stepped maps that lead to chaotic behavior. The methods provide continuous time interpolation between the time steps, thereby revealing the maps to be splintered Hamiltonian systems underlain by novel potentials. A sequence of successively deepening switchback potentials for a particle driven by Hamiltonian dynamics explains, in very physical terms, the frequency doubling and trajectory folding that occur on the particular route to chaos revealed by the logistic map, $x \rightarrow 4x(1-x)$.

Comments: This paper, and its precedent [arXiv:0909.2424](https://arxiv.org/abs/0909.2424) [math-ph], are dedicated to Murray Gell-Mann on the occasion of his 80th birthday

Subjects: **Chaotic Dynamics (nlin.CD)**; High Energy Physics - Theory (hep-th); Mathematical Physics (math-ph)

Report number: ANL-HEP-PR-10-3 and UMTG-13

Cite as: [arXiv:1002.0104v2](https://arxiv.org/abs/1002.0104v2) [nlin.CD]

Submission history

From: Thomas Curtright [[view email](#)]

[v1] Sun, 31 Jan 2010 19:25:33 GMT (48kb)

[v2] Mon, 8 Feb 2010 02:03:15 GMT (48kb)

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