

SYMPLECTIC MAPS

symplectic

$$= p \wedge q. \quad (1)$$

$(q_i, p_i), i = 1, \dots, n,$

$(v, w) \in \mathbb{R}^{2n} \times \mathbb{R}^{2n} \rightarrow \langle v, w \rangle = \sum_{i=1}^n (v_i w_{n+i} - v_{n+i} w_i) = v^T J w$

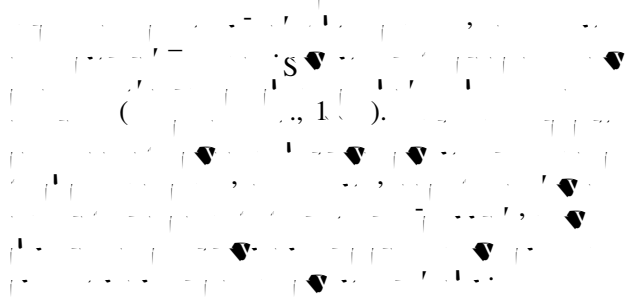
$J = \begin{pmatrix} 0 & I \\ -I & 0 \end{pmatrix}$

$F(q, p) = \int_{q_0}^q \int_{p_0}^p \langle v, w \rangle \dots$

$$F(q, p) = q' p' + \int_{q_0}^q \int_{p_0}^p H(q, p) dq dp$$

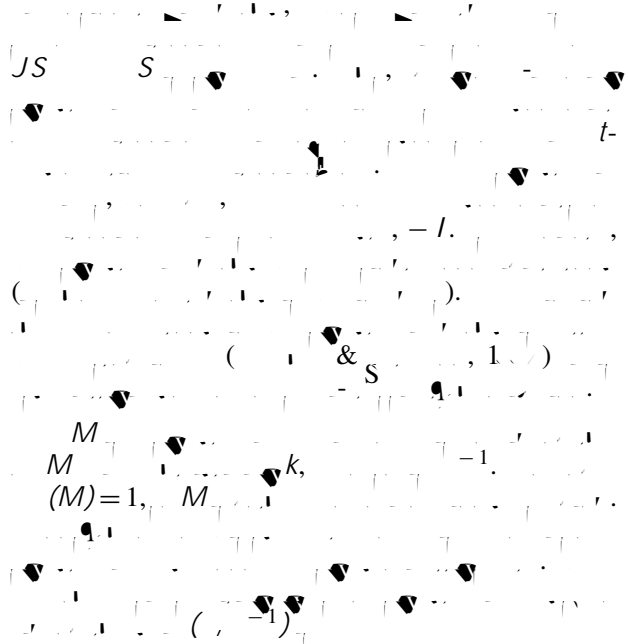
$$q' = q + t \frac{H}{p'}, \quad p' = p - t \frac{H}{q}. \quad (4)$$

$H = K(p) + V(q)$

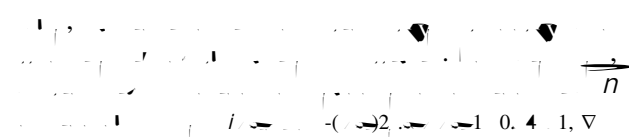


The Symplectic Group

$z_{t+1} = f(z_t)$, $M = \prod_t Df(z_t)$, $M^T J M = J$, $Sp(2n)$, $n(2n+1)$



- hyperbolic,
- hyperbolic with reflection,
- elliptic, $= 2$
- Krein quartet



$m \cdot (0) \neq n$ m n

C $D(0)$ $(n$
 (1))

n
 beyond all orders.

$n=1$. $\mathbb{S} \times \mathbb{R}$ (
 $q'/p \geq c > 0$.

Lipschitz graph, $p = P(q)$,
 cantorus

2001). (1, 1)

& (1, 2).

(a, b, c) (1, 1).

See also Aubry–Mather theory; Cat map; Chaotic dynamics; Constants of motion and conservation laws; Ergodic theory; Fermi acceleration and Fermi map; Hamiltonian systems; Hénon map; Horseshoes and hyperbolicity in dynamical systems; Lyapunov exponents; Maps; Measures; Melnikov method; Phase space; Standard map

Further Reading

1. *Mathematical Methods of Classical Mechanics*,
 1. *Beam Dynamics: A New Attitude and Framework (The Physics and Technology of Particle and Photon Beams)*,
 2001. *Symplectic Twist Maps: Global Variational Techniques*,
 1. *S*

Manuscript Queries

Title: Encyclopedia of Non-linear Sciences
Alphabet S: Symplectic maps

Page	Query Number	Query
No Query		