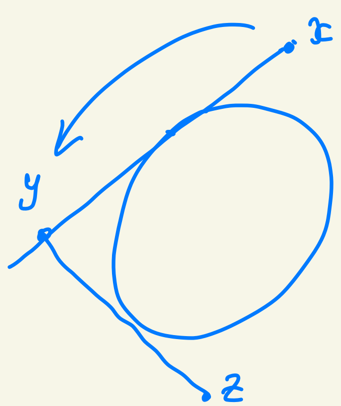
Табачников Геометрия и биллиарды

Каток Семинар "Глобус"

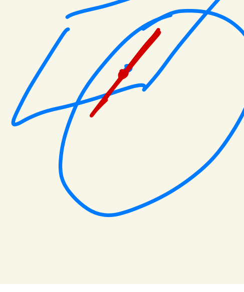
Синай

1).



$(\mathbb{R}^2, \omega)$

outer bil-d $(\mathbb{R}^{2n}, \omega)$



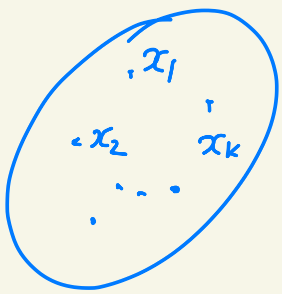
$M^{2n-1} \subset \mathbb{R}^{2n}$

How many periodic

orbits are there?

∀ odd period ∃ ≥ 1

∀ any period ∃ ≥ 1



$$F(x_1, \dots, x_k) = \sum_{1 \le i < j \le k} (-1)^{i+j} \omega(x_i, x_j)$$

k odd

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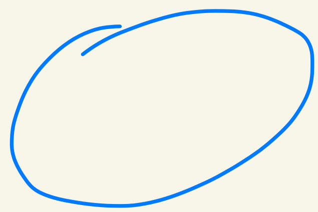
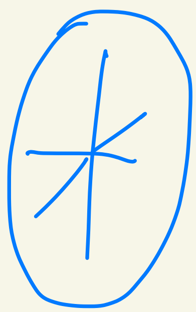
2). $\mathbb{R}^{1,1}$



n-periodic

∀n, rot # ≥ 2



$\mathbb{R}^{p,q}$

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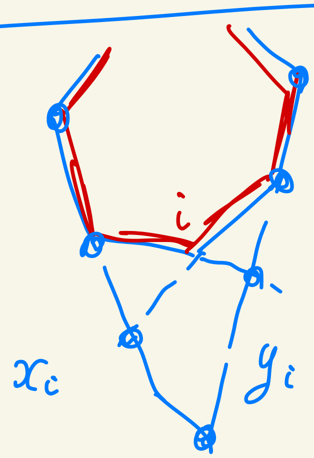
3)



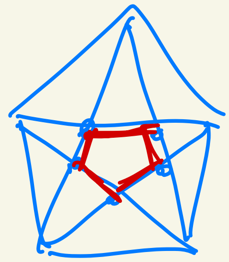
$$x_i^* = x_i \frac{1 + x_{i-1} y_{i-1}}{1 + x_{i+1} y_{i+1}}$$

$$y_i^* = y_{i+1} \frac{1 + x_{i+2} y_{i+2}}{1 + x_i y_i}$$

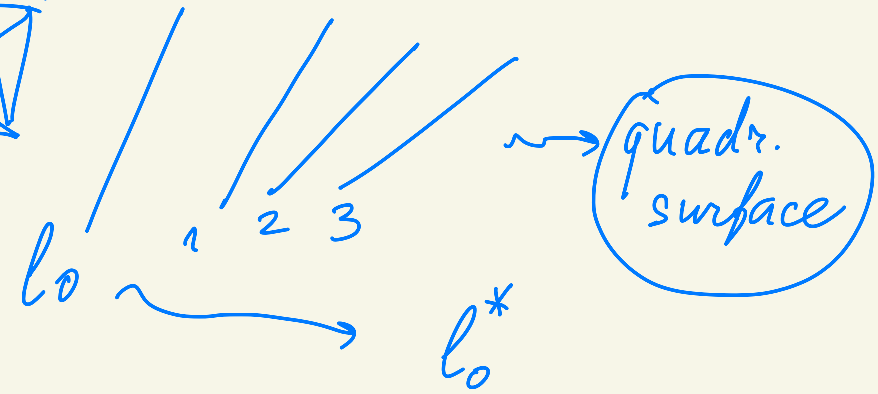
$\cdot \rightsquigarrow +$

$+ \rightsquigarrow \max$

4).

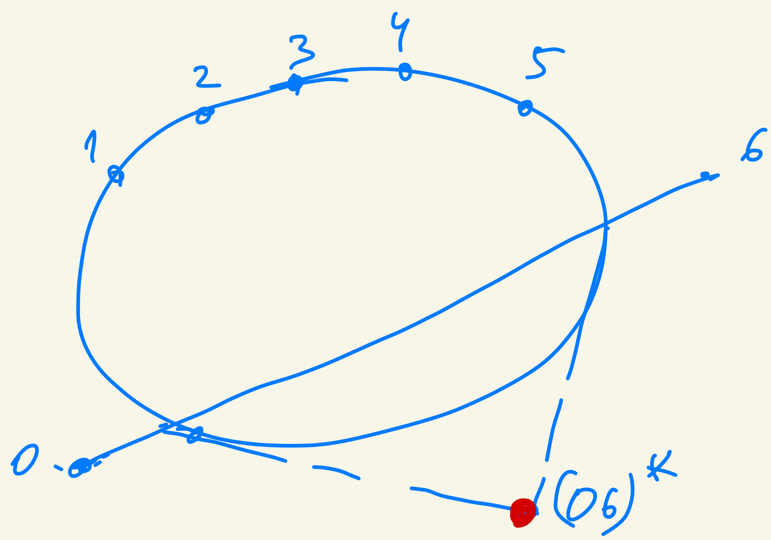


(i) $G_2(4)$ = lines in $\mathbb{P}^3$

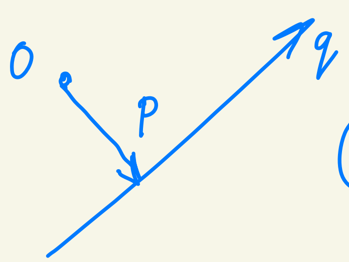


(ii) $\mathbb{P}^2$

$P_0 \ \underbrace{P_1 \dots P_5}_{\text{conic}} \ P_6 \qquad (P_0P_6)^* = pt.$

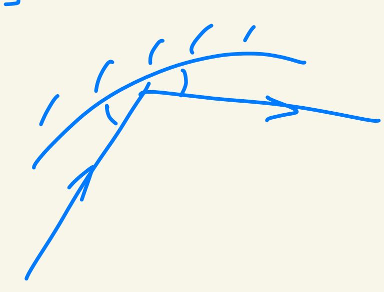


5). $\mathbb{R}^n$ oriented lines



T^*S^{n-1}

ω



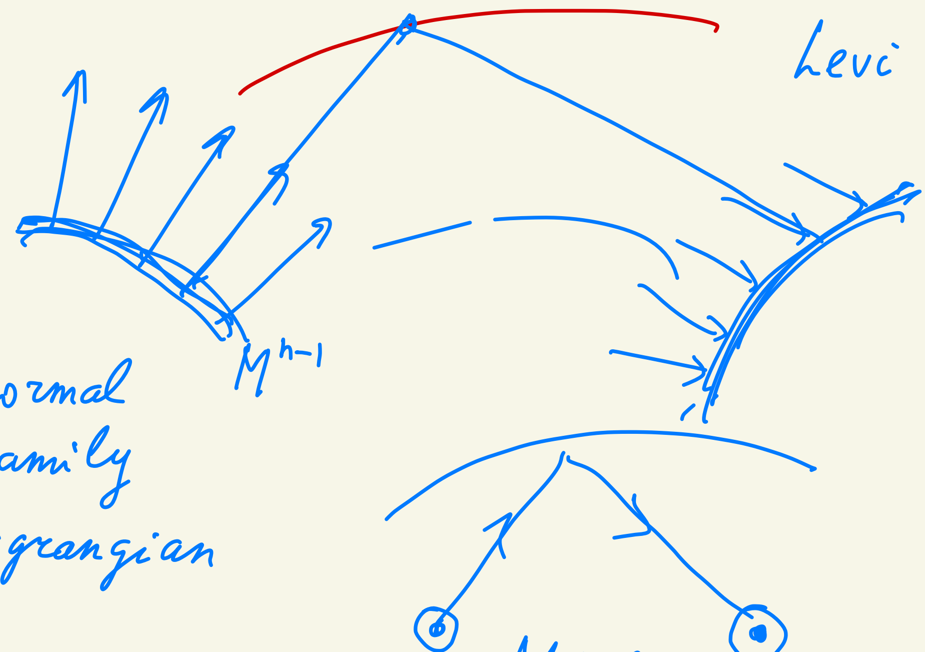
mirror $\longleftrightarrow$ $f(x_1, \dots, x_{n-1})$

symplectomorphism $\longleftrightarrow$ $H(p_1, \dots, p_{n-1}, q_1, \dots, q_{n-1})$

characterize optical sympl. maps

6).

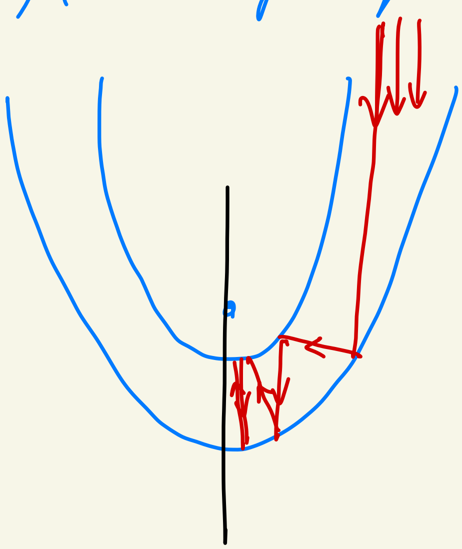
Levi Cevita



normal family Lagrangian

Möbius

7). Traps for beams of light



$\mathbb{R}^n$ $\underbrace{2n-2}$

$2n-3$ dim ?