## Sionville -> BBGKY

Born

Dogoliumov

Green

Kirchwood

Yvon

## · Siouville's theorem

## · Park Hon

## . Goal

asin quanta m sy ste me

$$g^{(s)} = tr p^{tot}$$

$$f^{(s)} = tr p^{tot}$$

$$f^{(s)} = \int_{S+1}^{N} dp_k dq_k f^{(s)}$$

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as un quantum system

Jax Vp. a(x) = - Jax p(x) V. a(x)

a) integraling in dPB

-  $\int dq_B dP_B \frac{\partial^2 H}{\partial q_B \partial P_B} \circ S$ 

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Now consider the third term

· Pair vise interact on

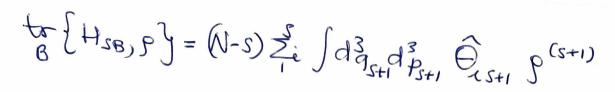
H= 
$$\sum_{i}^{2} \frac{P_{i}^{2}}{2m} + \frac{1}{2} \sum_{i \neq j} V(i\vec{q_{i}} - \vec{q_{j}}i) + \sum_{i} \varphi(q_{i})$$
  
therefore ext potend

HSB = Zi ZJ N(192-971) (nofactor \$!!)

the tird-term reads

$$\Theta_{y} = \frac{\partial V}{\partial q_{j}} \frac{\partial}{\partial p_{k}} + \frac{\partial V}{\partial q_{k}} \frac{\partial}{\partial p_{k}}$$

integrated taxables on identical particles



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b) integrate en P3+1 auget i seile in.

- Sdagstidagsti desti posti OBSTIDAGSTI

tr  $\{H_{SB}, P\} = \int dP_{SH} dQ_{SH} (N-S) \sum_{i=0}^{8} \frac{\partial V_{i,SH}}{\partial Q_{i}} \frac{\partial p^{(S+1)}}{\partial P_{i}}$ finally

(1) (S) = -(N-S) = -(N-S) = (N-S) = (N

Examples

$$H_s = \frac{\vec{p}^2}{2m} + (\vec{p}(\vec{q})) = H^{(4)}$$
external potential
$$S_s = S^{(4)}(\vec{p}, \vec{q}, t)$$

$$H_S = H^{(0)} = \frac{\overline{p}_1^2}{2m} + \frac{\overline{p}_2^2}{2m} + \Phi(\overline{q}_1) + \Phi(\overline{q}_2) + V(a_1 - a_1)$$

= + (N-2) 
$$\int d3 d\hat{\theta}_{13} + \hat{\theta}_{23} \int C_{3}^{(3)} d^{3} d\hat{q}_{3}$$

$$\Theta_{ij} = \frac{\partial \vec{q}}{\partial \vec{q}_i} \frac{\partial \vec{p}_j}{\partial \vec{p}_j} + \frac{\partial \vec{V}}{\partial \vec{q}_i} \frac{\partial \vec{p}_i}{\partial \vec{p}_i}$$