Chapter 2

Distribution Functions and statistical av.

Review Hamiltonian Mech

Newton's laws $F_i = m a_i$

$H = K.E + P.E.$

$\frac{\partial H}{\partial q_i} = -\dot{p}_i$ $\quad i = 1 \cdots s$

$\frac{\partial H}{\partial p_i} = \dot{q}_i$; $H = H(p_1 \cdots p_s ; q_1 \cdots q_s ; t)$

$q_i(t, q_{10} \cdots q_{s0} ; p_{10} \cdots p_{s0})$; $p_i = (\qquad)$

hard to do 10^{22}

give up mechanical description

go over to probabilities

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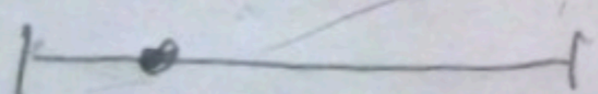
1 dimension ; 1 part

box



$w(q)$: prob. to be between

introduce prob. density

$dw = \rho(q) dq$

$\int dw = 1$

$\int \rho(q) dq = 1$ Normalization

average $f(q)$

$\bar{F} = \int \rho(q) f(q) dq$

Averages

$dw = \underbrace{\rho(t, q_1 \cdots q_s ; p_1 \cdots p_s)}_{\text{generalized prob. density}} dq_1 \cdots dq_s dp_1 \cdots dp_s$

$\int dw = 1$

$= \int \rho(q, p) dq dp$

$f(q, p)$

$\bar{F}(t) = \int \rho(t, p, q) f(p, q) dp dq$