Course 565/665 Lecturer Prof. Cavagnero
Day 2.19.04 Date 9:55 am
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Intuition: disorder is additive (?)

$W \propto$ disorder

$S \propto$ disorder

which is the appropriate fn. (S or W) for disorder?

$$W_{tot} = \prod_{i=1}^{t} W_i = W_1 \cdot W_2 \cdots W_t$$

$$\frac{S_{tot}}{k} = \ln W_{tot} = \ln (W_1 \cdot W_2 \cdots W_t) = \ln W_1 + \ln W_2 + \cdots \ln W_t$$

$$S_{tot} = S_1 + S_2 + \cdots S_t \qquad (S - \text{additive})$$
$$(W - \text{not } \checkmark)$$

If "S is maximized always":

A. systems that obey no specific constraints
$\Rightarrow$ distribution is random.

B. systems that obey specific constraints (given by experimental knowledge: Average values)
$\Rightarrow$ distribution is non-random.

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(A). t — # of series of a "die"

N — # of die tosses ($N \to$ large)

$\sum_{i=1}^{t} P_i = 1$; $\sum_{i=1}^{t} dP_i = 0$

$S = -k \sum_{i=1}^{t} P_i \ln P_i$