

Definition 10.37 The volume of a set A in \Re^n is defined as

$$\text{Vol}(A) = \int_A d\mathbf{x}$$

Theorem 10.38 (AEP II for Continuous Random Variables) The following hold for any $\epsilon > 0$:

1) If $\mathbf{x} \in W_{[X]\epsilon}^n$, then

$$2^{-n(h(X)+\epsilon)} < f(\mathbf{x}) < 2^{-n(h(X)-\epsilon)}$$

2) For n sufficiently large,

$$\Pr\{\mathbf{X} \in W_{[X]\epsilon}^n\} > 1 - \epsilon$$

3) For n sufficiently large,

$$(1 - \epsilon)2^{n(h(X)-\epsilon)} < \text{Vol}(W_{[X]\epsilon}^n) < 2^{n(h(X)+\epsilon)}$$