



## INTRODUCTION

# R

**R**andomness is a central concept in probability theory and statistics. The concept of a random process is one that evolves in a way that is unpredictable and uncorrelated. This is often modeled using a Markov process, where the state of the system at any given time depends only on its state at the previous time step. The theory of random walks is a classic example of a random process, where the path of a particle is determined by a sequence of random steps. The central limit theorem states that the distribution of the sum of a large number of independent, identically distributed random variables will approach a normal distribution. This theorem is a cornerstone of statistics and has numerous applications in science and engineering.

Another important concept in probability theory is the binomial distribution, which describes the number of successes in a fixed number of independent trials, each with a constant probability of success. The binomial distribution is often used to model events such as the number of heads in a series of coin flips or the number of defective items in a batch. The normal distribution, also known as the Gaussian distribution, is another fundamental probability distribution that is widely used in statistics and probability theory. It is characterized by its bell-shaped curve and is often used to model natural phenomena that exhibit random fluctuations.

The concept of entropy is also closely related to randomness. Entropy is a measure of the amount of information or uncertainty in a system. In a random process, the entropy is high because there is a large amount of uncertainty about the outcome of the process. Conversely, in a highly ordered system, the entropy is low because there is less uncertainty about the outcome. The theory of entropy has applications in many fields, including physics, information theory, and statistics.

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(2000), (2005, 2004), (2005), (2005),

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...  
... (y ... z) ...  
... (y ... z) ...

$\pi-\pi^*$

$10^3$   $10^6$

$10^{-4}$   $10^{-6}$

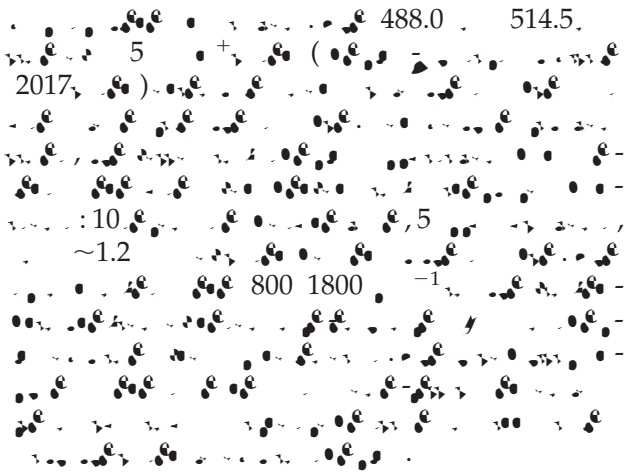
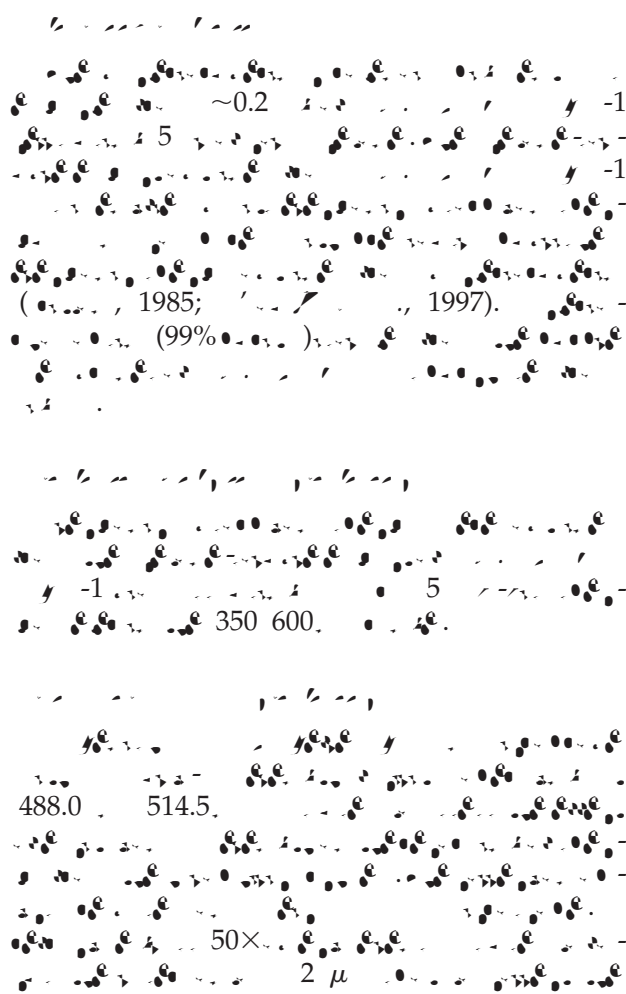
$\pi$

$\beta$

$2$

$\pi-\pi^*$

$0-2$



RESULTS AND DISCUSSION

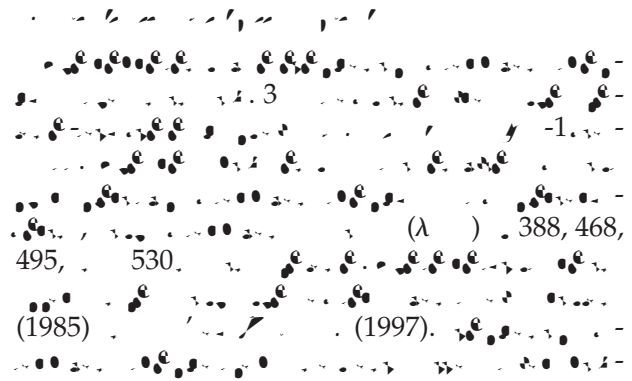


FIG. 3. T a a - λ a *Hb. alinar m NRC-1* 468, 495, 530.

$10^5$

(~150)

3).

(

3).

$\pi$

$1^1$

$1^1$

3).

$1^1$

$\beta$ - $\gamma$  488.0 514.5  
 (2006).  
 514.5

1000, 1152, 1505

-1, 1000, 1152, 1505  
 (5). 1000, 1152, 1505

$\nu_1^{-1}(\cdot)$  ( = ) . . . . . 50 . . . . .  
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 . . . . . (2003) . . . . .  
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(1600 1500<sup>-1</sup>), (1400 1250<sup>-1</sup>), (1250  
1100<sup>-1</sup>), (1000 700<sup>-1</sup>)

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$\frac{1}{2} \int_0^1 \frac{1}{x} dx = \frac{1}{2} \ln 2$

$\int_0^1 \frac{1}{x} dx = \ln 2$

1991. 488.0  
 514.5

$(v^4)$   
 514.5  
 780

(2003)

$\nu_1 = 1505^{-1} = 13 = 168, 68 \text{ 71.}$   
 $(2004) = 35, 470 \text{ 474.}$   
 $(2005) = 174, 560 \text{ 571.}$   
 $(2003) = 3, 565 \text{ 579.}$   
 $(1989) = 1, 2, 3, 25, 601 \text{ 604.}$   
 $(1999) = 28, 367 \text{ 399.}$   
 $(1974) = 20, 241 \text{ 243.}$   
 $(2001) = 1, 161 \text{ 164.}$   
 $(1979) = 2, 1, 73.$   
 $(2006) = 41, 182 \text{ 189.}$   
 $(2002) = 39, 1 \text{ 7.}$   
 $(1996) = 35, 7802 \text{ 7811.}$   
 $(1995) = 53, 50, 23, 23, 627 \text{ 634.}$   
 $(2005) = 77, 212 \text{ 221.}$

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ABBREVIATIONS

The following abbreviations were used in this manuscript: [illegible abbreviations]

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[illegible reference list for the left column]

[illegible reference list for the right column]

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