

Университет ИТМО
Факультет ПИиКТ

ЛИНЕЙНАЯ АЛГЕБРА

I СЕМЕСТР

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Проект на GitHub

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1 2023-09-13

1.1 Intro

Аннотации, аннотации, аннотации!!!

Примерно по тематике лекций. Найти статью, приближенную к теме лекции. Формат: А4. Плюсы и минусы аннотаций.

- ▷ Lectures (2 times a week)
- ▷ Labworks (2 times a week)
- ▷
 - Annotations
 - 2 tests in CDO
 - Exam
 - Bonuses for detected mistakes & inordinary solutions

Замечание. Main goal is **to learn a lot of information fastly and effectively**

1.2 Information theory

Classic definition:

Определение 1.1 (Probability). $p(A) = \frac{m}{n}$

Statistic definition:

Определение 1.2. $p(A) = \lim_{n \rightarrow \infty} \frac{m}{n}$

Свойство 1.2.1. $0 \leq p(A) \leq 1$

1.3 Hartley measure

A system S can be in N conditions. Then, we can represent a condition using powers of 2. Because of $P = \frac{1}{N}$,

1.4 Shannon's measure

$$i(S) = - \sum_{i=1}^N p_i \cdot \log_2 p_i$$

N – amount of system's conditions

p_i – probability of S in condition i

Пример. We have 3 jokers, 3 aces, 1 king, 1 queen, 1 jack. What's the amount of information?

1.5 Why different volume on different devices?

Приставки в СИ	Новые двоичные приставки	Δ
$kB = 10^3 \text{byte}$	$KiB = 2^{10} \text{byte}$	2%
$MB = 1e6$	$MiB = 2e20$	5%
...

1.6 Unary notation

The main disadvantage – absence of zero.

Let $X_{(q)} = x_{n-1}x_{n-2} \dots x_0.x_{-1}x_{-2} \dots x_{-m}$

$$X_{(q)} = \sum_{i=-m}^{n-1} x_i \cdot q^i$$

Задача. $0,8125_{10} = ?_{(2)}$

1.7 Optimal notation

Задача. *Robinson Crusoe has found 60 stones. How many days we can code using this 60 stones?*

e is optimal.

Optimal means best on some criteria/option

Обеспечивать, число и функциональность

1.8 Transposition to any notation

1.9 Bergman's Notation

$$\forall x \in \mathbb{R} : x = \sum_{k=-n}^{n-1} d_k \cdot z^k, \text{ where } d_k \in \{0, 1\}, z = \frac{1+\sqrt{5}}{2}$$

Slide is fucked up

1.10 Zekendorf's notation

$$x = \sum_{k=1}^n d_k F_k, \text{ where } d_k \in \{0, 1\}, F_k \text{ are Fibonacci numbers}$$

2 «1's» in a row is forbidden!

1.11 Factorial notation

$$x = \sum_{k=1}^n d_k k!$$