$$c(n,k) = \frac{n\cdot(n-1)\cdot\ldots\cdot(n-k+1)}{k!} = \binom{n}{k} \qquad \frac{3\cdot 2}{2} = 6$$

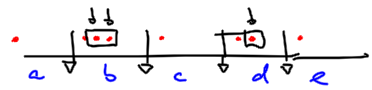
$$\binom{3}{2} = \frac{3\cdot 2}{2} = 3 \qquad C(3,2) = \binom{3+2-1}{2} = 6$$

$$C(n,k) = \binom{n+k-1}{k}$$

n různých typů

= n "sloupců"

výběr $\underbrace{\{b,b,d\}}$



n+k políček

n-1 přihrádek a po ní n+k-1 míst

$$\Rightarrow \binom{n+k-1}{n-1} \text{ možností}$$

9 27-18:02

$$\binom{n+1}{k+1} = \binom{n}{k} + \binom{n}{k+1}$$

$n=0$ $\binom{0}{0}$

$n=1$ $\binom{1}{0}$ $\binom{1}{1}$

$n=2$ $\binom{2}{0}$ $\binom{2}{1}$ $\binom{2}{2}$

$\vdots$

$$f(n+1) = F(n, f(n))$$

$$f(0) \Rightarrow f(1) \Rightarrow f(2) \Rightarrow \ldots$$

Lineární:

$$f(n+1) = a_n \cdot f(n) + b_n$$

9 27-18:23

Theorem: $f(n) = \left(\prod_{i=0}^{n-1} a_i\right) y_0 + \sum_{r=0}^{n-1}\left(\prod_{i=r+1}^{n-1} a_i\right) b_r$

kde

$f(0) = y_0$

$f(n+1) = a_n f(n) + b_n$.

$a_i = a$, $b_i = b$:

$$f(n) = a^n y_0 + \underbrace{(1+a+a^2+a^{n-1})\cdot b}_{= \frac{1-a^n}{1-a}\cdot b}$$

$$(1-a^n) = (1-a)(1+a+\ldots+a^{n-1})$$

9 27-18:29

8 pater, výtah, 5 osob.

pravděpodobnost, že vystoupí:

$|\Omega| = 8^5$

1) v 6. podlaží $= 1/8^5$

2) ve stejném $= 1/8^4$

3) každý v jiném

$$= \binom{8}{5}\cdot 5!/8^5 = \frac{v(5,8)}{V(5,8)}$$

$$= \frac{\cancel{8}\cdot 7\cdot 6\cdot 5\cdot 4}{8^5} = \frac{7\cdot 3\cdot 5}{8^3} \doteq 0{,}2$$

9 27-18:40

$$P(A\cup B) = P(A) + P(B\setminus A)$$

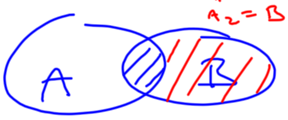
$$\underline{P(B) = P(B\cap A) + P(B\setminus A)}$$

$$P(A\cup B) = P(A) + P(B) - P(B\cap A)$$

$$= \sum_{i=1}^{2} P(A_i) + (-1)^{2-1} P(A_1\cap A_2)$$

$A_1 = A$

$A_2 = B$



9 27-18:39

$$P\left(\bigcup_{i=1}^{k+1} A_i\right) = P\left(\bigcup_{i=1}^{k} A_i \cup A_{k+1}\right)$$

$$= \underbrace{P\left(\bigcup_{i=1}^{k} A_i\right)} + \underbrace{P(A_{k+1})} - P\left(\left(\bigcup_{i=1}^{k} A_i\right)\cap A_{k+1}\right)$$

$$= \sum_{i=1}^{k+1} P(A_i) - \ldots + (-1)^{k-1} P(A_1\cap\ldots\cap A_k)$$

$$- \boxed{P\left(\left(\bigcup_{i=1}^{k} A_i\right)\cap A_{k+1}\right)}$$

$$= -P\left((A_1\cap A_{k+1})\cup\ldots\cup(A_k\cap A_{k+1})\right)$$

znovu rozepíšeme dle předpokladu

$\Rightarrow$ vyjde správně!

9 27-19:37

Sčítání pravděpodobnost

$$\underbrace{\left|M \setminus \left(\bigcup_{i=1}^{k} A_i\right)\right|} + \underbrace{\left|\bigcup_{i=1}^{k} A_i\right|} = \underbrace{|M|}$$

9 27-19:45