Výsledky příkladů

Cvičení 1: Klasická pravděpodobnost

1. a) 11/36, b) $1-(5/6)^n$

2. 0,95.

3. (a) 0,083
   (b) 0,618
   (c) $1-\frac{365\cdot 364\cdot 363\cdot\ldots\cdot 336}{365^{30}} \doteq 0{,}706$

4. (a) $\frac{m}{n+m}$;
   (b) $\frac{\binom{K}{k}\binom{n+m-K}{m-k}}{\binom{n+m}{m}}$ pokud $m \geq k$, $n \geq K-k$, $K \geq k$, jinak 0;

5. Maxwell-Boltzmann
   (a) $\mathsf{P}(A_k) = \binom{r}{k}\left(1-\frac{1}{n}\right)^{r-k}\cdot\left(\frac{1}{n}\right)^k$ pro $k = 0, 1, \ldots, r$ a $\mathsf{P}(A_k) = 0$ pro $k > r$
   (b) $\lambda^k \mathrm{e}^{-\lambda}/k!$ pro $k = 0, 1, 2, \ldots$
   (c) $\mathsf{P}(C) = \sum_{k=0}^{n-1}(-1)^k\binom{n}{k}\left(\frac{n-k}{n}\right)^r$ pro $r \geq n$ a $\mathsf{P}(C) = 0$ pro $r < n$

6. Bose-Einstein
   (a) $\mathsf{P}(A_k) = \frac{\binom{n+r-k-2}{r-k}}{\binom{n+r-1}{r}} = \frac{r!\,(n+r-2-k)!\,(n-1)}{(r-k)!\,(n+r-1)!}$ pro $k = 0, 1, \ldots, r$ a $\mathsf{P}(A_k) = 0$ pro $k > r$
   (b) $\frac{\lambda^k}{(1+\lambda)^{k+1}}$ pro $k = 0, 1, \ldots$
   (c) $\mathsf{P}(C) = \frac{\binom{r-1}{r-n}}{\binom{n+r-1}{r}} = \frac{(r-1)!\,r!}{(n+r-1)!\,(r-n)!}$ pro $r \geq n$ a $\mathsf{P}(C) = 0$ pro $r < n$

7. 4 kostky:
   (a) 5/18
   (b) 1/16
   (c) $10/6^4$
   (d) $1-5/6^4$

8. $\sum_{k=0}^{9}(-1)^k\binom{10}{k}\left(\frac{10-k}{10}\right)^{16} \doteq 0{,}070$ (použije se Maxwellovo-Boltzmannovo schéma)