11. úkol

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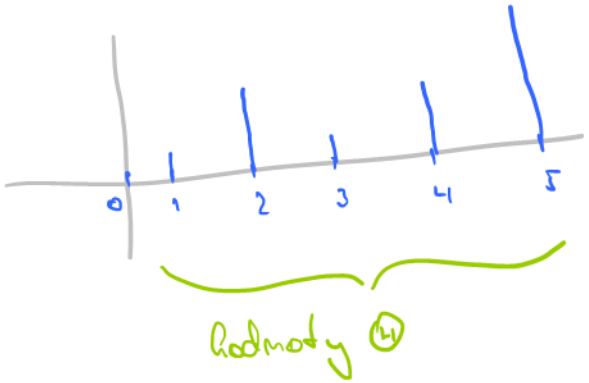
teorie

MAP

chceme zvolit $\hat{\vartheta}$ aby maximalizovalo

$$P_{\Theta|X}(\vartheta|x)$$



vlastnost:

$$P(\Theta = \hat{\vartheta} \mid X = x)$$

je nejvyšší možná

→ že se trefíme přesně

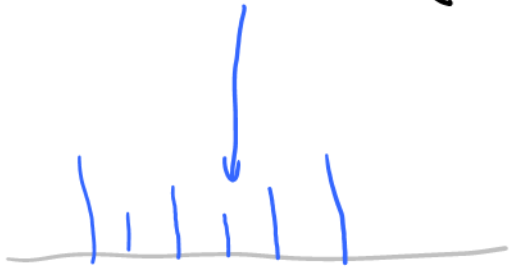
LMS

met. podmíněné stř. hodnoty

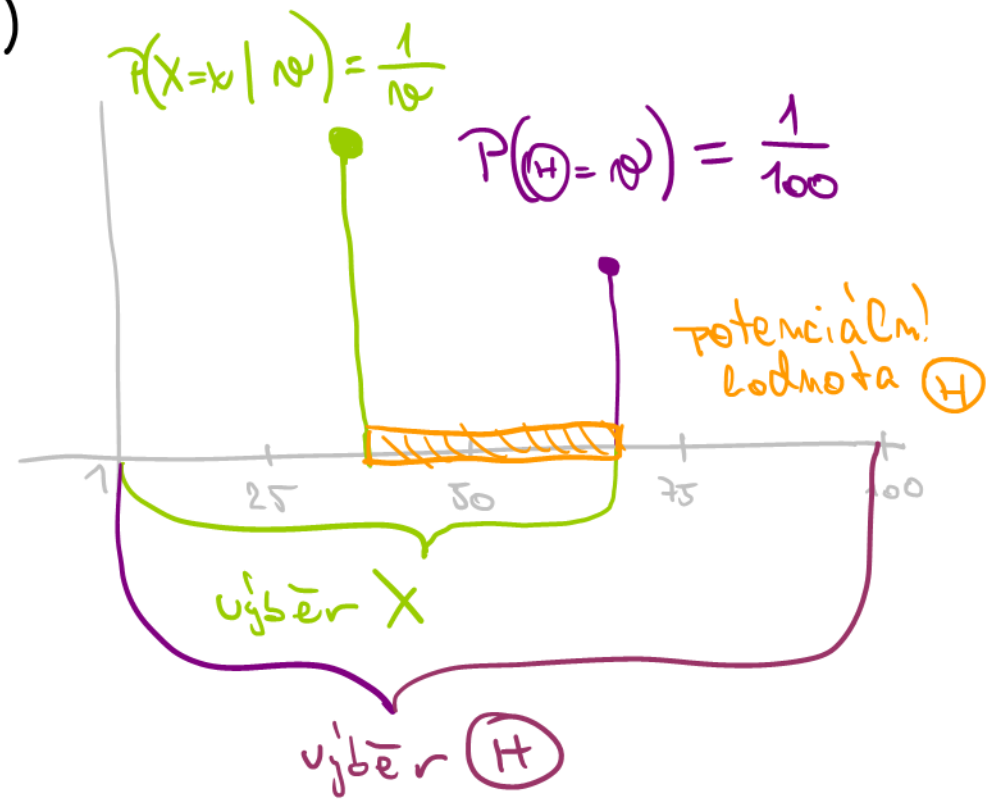
volíme $\hat{\vartheta} = E(\Theta|X=x)$

chceme maximalizovat

čtverců



a)



$\theta \geq x$ nemůžu mít číslo vozíku větší než # vozíků

$P(\textcircled{H}=\theta) \leq P(X=x)$

protože X vybírám z intervalu, který je $\leq$ intervalu odkud beru $\textcircled{H}$

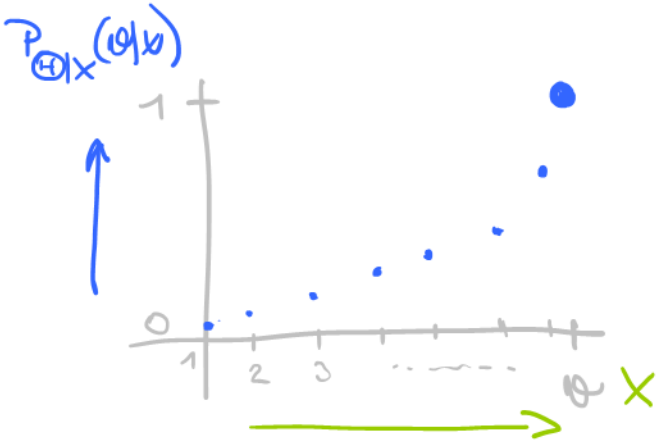
$\theta = 20$

$x = 3$

$$\sum_{\theta'=x}^{\theta} \frac{1}{100} \cdot \frac{1}{\theta'}$$

$$\| \quad \| \quad \|$$

$$P_{\textcircled{H}}(\theta) \cdot P_{X|\textcircled{H}}(X=x \mid \textcircled{H}=\theta)$$



$$P_{\textcircled{H}|X}(\theta|x) = \frac{P_{X|\textcircled{H}}(x|\theta) \cdot P_{\textcircled{H}}(\theta)}{\sum P_{X|\textcircled{H}}(x|\theta') \cdot P_{\textcircled{H}}(\theta')} = \frac{\frac{1}{\theta} \cdot \frac{1}{100}}{\sum_{\theta'=x}^{\theta} \frac{1}{\theta'} \cdot \frac{1}{100}}$$

posteriorní distribuce

$\max\{P_{\textcircled{H}|X}(\theta|x)\}$ nastává pro $\theta = x$

"zkouška"

$\theta = 10$, $x = 3$

$$\frac{\frac{1}{10}\cdot\frac{1}{100}}{\sum_{\theta'=3}^{10}\frac{1}{\theta'}\cdot\frac{1}{100}} = \frac{\frac{1}{10}\cdot\frac{1}{100}}{\underbrace{\frac{1}{3}\cdot\frac{1}{100}}_{\frac{1}{300}} + \underbrace{\frac{1}{4}\cdot\frac{1}{100}}_{\frac{1}{400}} + \underbrace{\frac{1}{5}\cdot\frac{1}{100}}_{\frac{1}{500}} + \underbrace{\frac{1}{6}\cdot\frac{1}{100}}_{\frac{1}{600}} + \underbrace{\frac{1}{7}\cdot\frac{1}{100}}_{\frac{1}{700}} + \underbrace{\frac{1}{8}\cdot\frac{1}{100}}_{\frac{1}{800}} + \underbrace{\frac{1}{9}\cdot\frac{1}{100}}_{\frac{1}{900}} + \underbrace{\frac{1}{10}\cdot\frac{1}{100}}_{\frac{1}{1000}}}$$

$x = 3$

$\theta' = 3, \dots, 10$

$P_\Theta(\theta' = 3) = \frac{1}{3} \rightarrow P_{X|\Theta}(x=3 \mid \theta=3) = \frac{1}{3}$

$\vdots$

$(\theta' = 6) = \frac{1}{6} \rightarrow P_{X|\Theta}(x=3 \mid \theta=6) = \frac{1}{6}$

$\vdots$

$(\theta' = 10) = \frac{1}{10} \rightarrow P_{X|\Theta}(x=3 \mid \theta=10) = \frac{1}{10}$

$P_{\Theta|X}(\theta=10 \mid x=3) \doteq 0{,}07$

$P_{\Theta|X}(\theta=100 \mid x=99) \doteq 0{,}49$

$P_{\Theta|X}(\theta=10 \mid x=10) = 1$

vzorečky jsou dobře