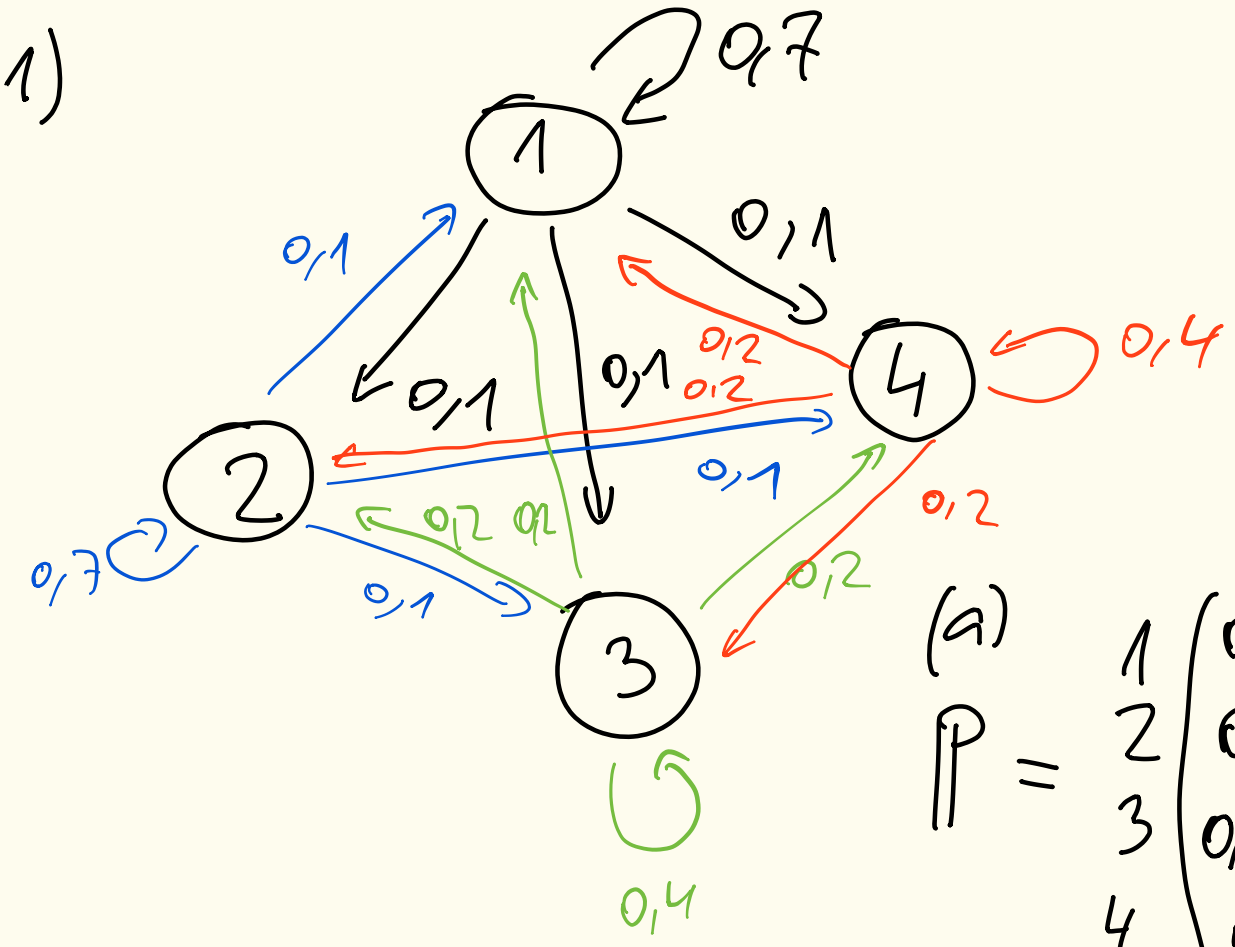
(1)



(a)

$$P = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{pmatrix} 0{,}7 & 0{,}1 & 0{,}1 & 0{,}1 \\ 0{,}1 & 0{,}7 & 0{,}1 & 0{,}1 \\ 0{,}2 & 0{,}2 & 0{,}4 & 0{,}2 \\ 0{,}2 & 0{,}2 & 0{,}2 & 0{,}4 \end{pmatrix} \end{array}$$

(b)

stac. vorh!

$$\pi_1 = 0{,}7\pi_1 + 0{,}1\pi_2 + 0{,}2\pi_3 + 0{,}2\pi_4$$
$$\pi_2 = 0{,}1\pi_1 + 0{,}7\pi_2 + 0{,}2\pi_3 + 0{,}2\pi_4$$
$$\pi_3 = 0{,}1\pi_1 + 0{,}1\pi_2 + 0{,}4\pi_3 + 0{,}2\pi_4$$
$$\pi_4 = 0{,}1\pi_1 + 0{,}1\pi_2 + 0{,}2\pi_3 + 0{,}4\pi_4$$
$$\pi_1 + \pi_2 + \pi_3 + \pi_4 = 1$$

$\pi_1 = a \quad \pi_2 = b \quad \pi_3 = c \quad \pi_4 = d$

$$10a = 7a + b + 2c + 2d$$
$$10b = a + 7b + 2c + 2d$$
$$10c = a + b + 4c + 2d$$
$$10d = a + b + 2c + 4d$$
$$a + b + c + d = 1$$

$$\left(\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ -3 & 1 & 2 & 2 & 0 \\ 1 & -3 & 2 & 2 & 0 \\ 1 & 1 & -6 & 2 & 0 \end{array}\right) \sim \left(\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ 0 & 4 & 5 & 5 & 3 \\ 0 & -4 & 1 & 1 & -1 \\ 0 & 0 & -7 & 1 & -1 \end{array}\right) \begin{array}{l} R1 \\ R2+R1 \\ R3-R1 \\ R4-R1 \end{array} \sim$$

$$\sim \left(\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ 0 & 4 & 5 & 5 & 3 \\ 0 & 0 & 6 & 6 & 2 \\ 0 & 0 & -7 & 1 & -1 \end{array}\right) \begin{array}{l} R_1 \\ R_2 \\ R_3+R_2 \sim \\ R_4 \end{array}$$

$$7R_5+R_4$$

$$0 \quad 49+1=50 \quad -8$$

$$\sim \left(\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ 0 & 4 & 5 & 5 & 3 \\ 0 & 0 & 3 & 3 & 1 \\ 0 & 0 & 0 & 8 & 1 \end{array}\right) \begin{array}{l} R_1 \\ R_2 \\ R_3/2 \\ 3R_4+7R_3 \end{array}$$

$$\left(\begin{array}{cccc|c} 0{,}1 & 0{,}1 & 0{,}1 & 0{,}1 & 0{,}1 \\ 0 & 0{,}4 & 0{,}5 & 0{,}5 & 0{,}3 \\ 0 & 0 & 0{,}3 & 0{,}3 & 0{,}1 \\ 0 & 0 & 0 & 2{,}4 & 0{,}4 \end{array}\right)$$

$$2{,}4\,\Pi_4 = 0{,}4$$

$$\Pi_4 = \frac{0{,}4}{2{,}4} = \frac{4}{24} = \frac{2}{12} = \underline{\underline{\frac{1}{6}}}$$

$$\frac{3}{10}\Pi_3 + \frac{3}{10}\cdot\frac{1}{6} = \frac{1}{10}$$

$$\frac{3\Pi_3}{10} + \frac{3}{60} = \frac{1}{10}$$

$$3\Pi_3 + \frac{3}{6} = 1$$

$$18\Pi_3 + 3 = 6$$

$$18\Pi_3 = 3$$

$$0{,}4\Pi_2 + 0{,}5\cdot\frac{1}{6} + 0{,}5\cdot\frac{1}{6} = 0{,}3$$

$$0{,}4\Pi_2 \quad \frac{1}{6} = \frac{3}{10}$$

$$0{,}4\Pi_2 = \frac{3}{10} - \frac{1}{6}$$

$$\frac{4}{10}\Pi_2 = \frac{2}{15}$$

$$\Pi_2 = \frac{20}{4\cdot 15} = \frac{20}{60} = \frac{1}{3}$$

$$\Pi_3 = \frac{3}{18} = \underline{\underline{\frac{1}{6}}}$$

$$\Pi_1 + \Pi_2 + \Pi_3 + \Pi_4 = 1$$

$$\pi_1 + \frac{1}{3} + \frac{1}{6} + \frac{1}{6} = 1$$

$$\pi_1 \quad \frac{1}{3} + \frac{1}{3} = 1$$

$$\pi_1 = \frac{1}{3}$$

$$\Pi = \begin{pmatrix} 1/3 \\ 1/3 \\ 1/6 \\ 1/6 \end{pmatrix}$$ stac. rozdělení

počty lidí ve stac. rozdělení $L = \begin{pmatrix} 400 \\ 400 \\ 200 \\ 200 \end{pmatrix}$

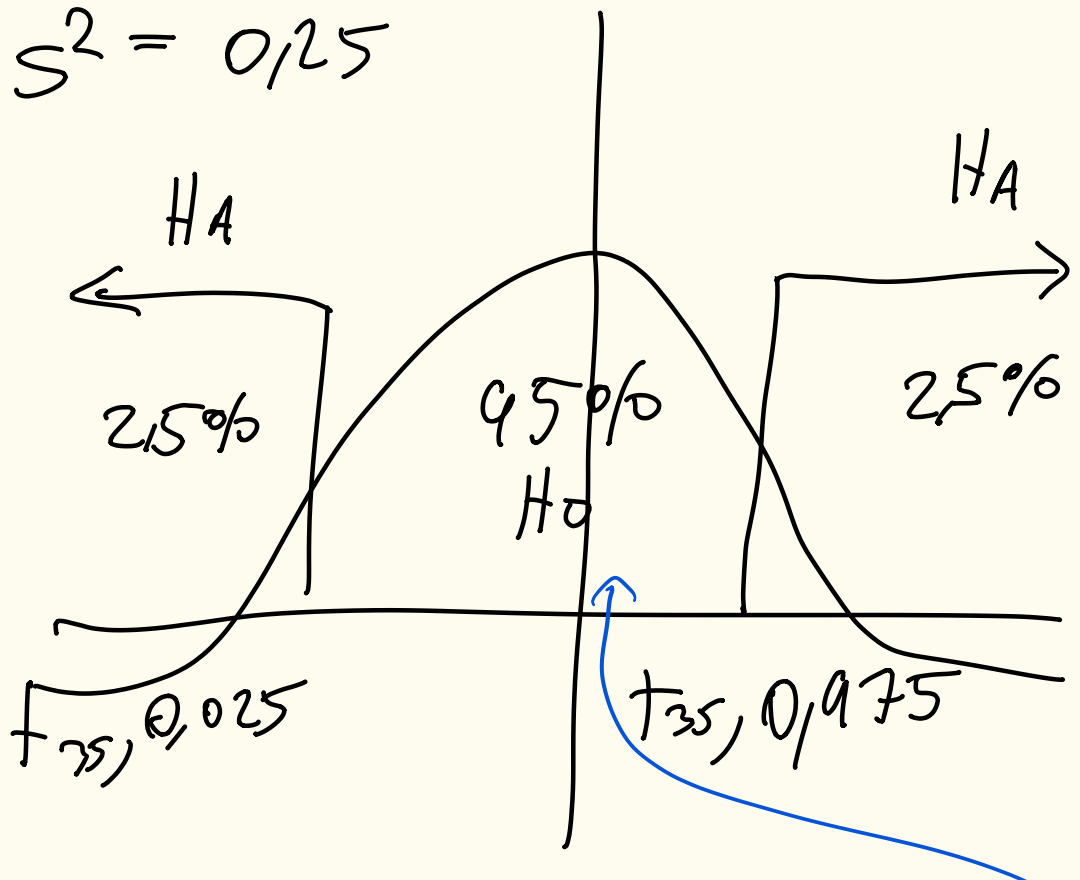
(2) 36 dat

$\overline{x_n} = 4{,}65$

$H_0: \mathbb{E}X = 4{,}50$

$H_A: \mathbb{E}X \neq 4{,}50$

$H_B: \mathbb{E}X > 4{,}50$



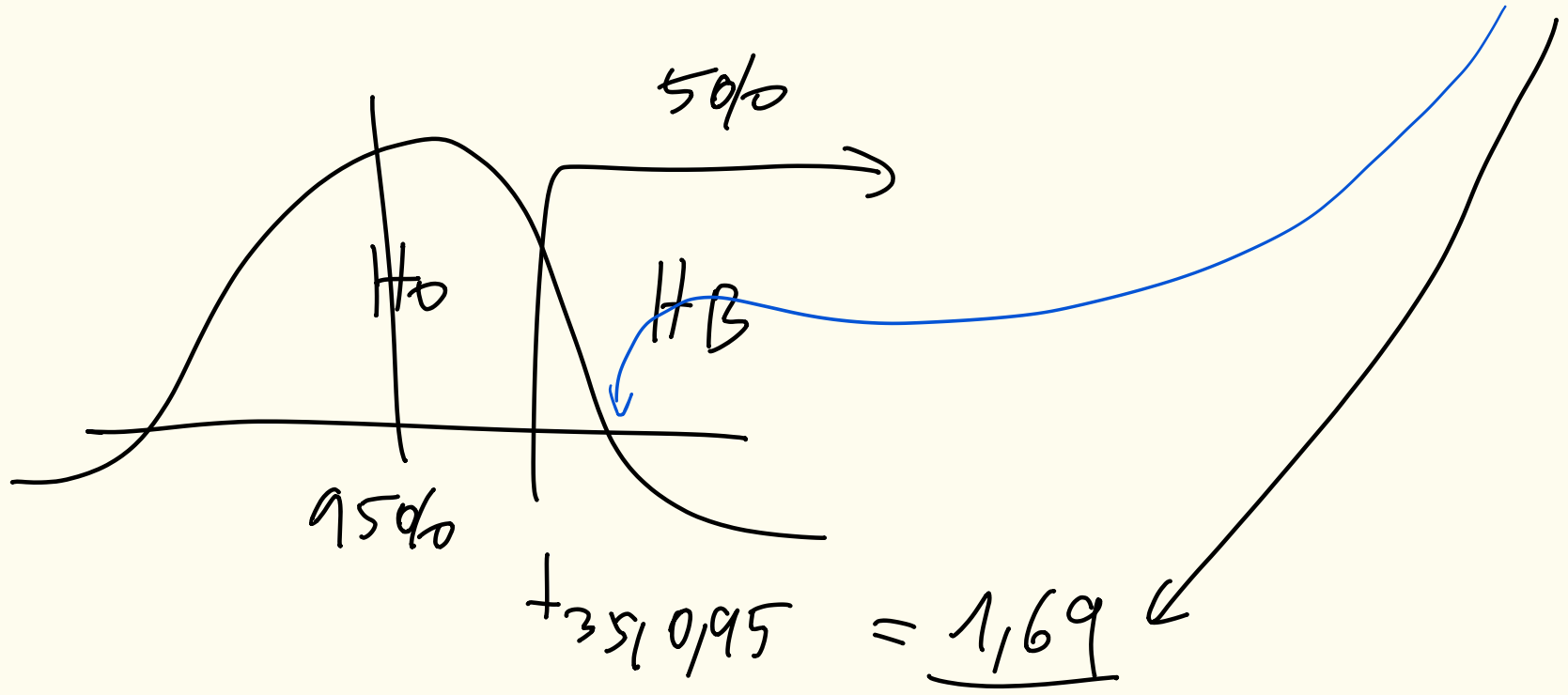
$t_{35,0{,}975} = 2{,}03$

$$T = \frac{\overline{x_n} - \mathbb{E}X}{s_n}\sqrt{n} = \frac{4{,}65 - 4{,}50}{\sqrt{0{,}25}}\sqrt{36} =$$

$$= \frac{0{,}15}{\sqrt{0{,}25}}\,6 = \frac{0{,}15}{0{,}5} = \frac{15}{50}\cdot 6$$

$$= \frac{3}{10}\cdot 6 = \frac{18}{10} = 1{,}8$$

H_0 nezamítáme ve prospěch H_A



$t_{35;\,0{,}95} = \underline{1{,}69}$

H_0 zamítáme ve prospěch H_B