

Hyperbola IV. - procvičováním

Sb. 59/5.104 Hyperbola má asymptoty dané rovnicemi
 $y-3 = 2(x+1)$ a $y-3 = -2(x+1)$ a prochází
 bodem $K[4,9]$. napište její H.

? S, a, b? S $[-1; 3]$ $a_1, a_2: y-m = \pm \frac{b}{a}(x-m)$

$$\frac{b}{a} = 2$$

$$\underline{b = 2a}$$

$$\text{H.: } \frac{(x+1)^2}{a^2} - \frac{(y-3)^2}{b^2} = 1$$

$$\text{II. } \frac{(y-3)^2}{a^2} - \frac{(x+1)^2}{b^2} = 1$$

$$\text{I. K: } \frac{25}{a^2} - \frac{36}{4a^2} = 1 \quad | \cdot 4a^2 \quad \text{II.}$$

$$100 - 36 = 4a^2$$

$$64 = 4a^2$$

$$a^2 = 16$$

$$\underline{a = 4} \quad \underline{b = 8}$$

$$\frac{36}{a^2} - \frac{25}{4a^2} = 1 \quad | \cdot 4a^2$$

$$144 - 25 = 4a^2$$

$$119 = 4a^2$$

$$\underline{a = \frac{\sqrt{119}}{2}} \quad \underline{b = \sqrt{119}}$$

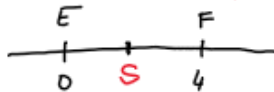
$$\text{H}_1: \frac{(x+1)^2}{16} - \frac{(y-3)^2}{64} = 1$$

$$\text{H}_2: \frac{4(y-3)^2}{119} - \frac{(x+1)^2}{119} = 1$$

59/5.107 napište její H., která má ohniska

$E[0;1]$, $F[4;1]$ a prochází bodem $L[4;4]$.

osa H. || osa x \Rightarrow I.



$$e = 2 \quad S[2;1]$$

$$e^2 = a^2 + b^2$$

$$\underline{a^2 + b^2 = 4}$$

$$\frac{(x-2)^2}{a^2} - \frac{(y-1)^2}{b^2} = 1$$

$$L: \frac{4}{a^2} - \frac{9}{4-a^2} = 1 \quad | \cdot a^2(4-a^2)$$

$$16 - 4a^2 - 9a^2 = 4a^2 - a^4$$

$$a^4 - 17a^2 + 16 = 0$$

sol. $a^2 = c \quad c^2 - 17c + 16 = 0 \quad (15)$

$$c_{1/2} = \frac{17 \pm \sqrt{289 - 64}}{2} \quad \left\{ \begin{array}{l} c_1 = 16 \\ c_2 = 1 \end{array} \right.$$

$$a_1 = 4 \quad b^2 = 4 - a^2 \quad b_1^2 = 4 - 16 = -12 \quad \times$$

$$a_2 = 1 \quad b_2^2 = 4 - 1 = 3 \quad b_2 = \sqrt{3} \quad \checkmark$$

$$\text{H: } \underline{\underline{\frac{(x-2)^2}{1} - \frac{(y-1)^2}{3} = 1}}}$$

59/5.114 c) Pro lateral real. cãta k nemã pãrã

$$5x - 2y + 2k = 0 \text{ o H. } 4x^2 - y^2 = 36 \text{ spol. bod.}^2$$

$$5x = 2y - 2k$$

$$x = \frac{2y - 2k}{5}$$

$$4 \cdot \left(\frac{2y - 2k}{5} \right)^2 - y^2 - 36 = 0$$

$$4 \cdot \left(\frac{4y^2 - 8yk + 4k^2}{25} \right) - y^2 - 36 = 0 \quad | \cdot 25$$

$$16y^2 - 32ky + 16k^2 - 25y^2 - 900 = 0$$

$$-9y^2 - 32ky + 16k^2 - 900 = 0$$

$$9y^2 + 32ky - 16k^2 + 900 = 0$$

$$A = 9$$

$$B = 32k$$

$$C = -16k^2 + 900$$

$$D < 0 \quad B^2 - 4AC < 0$$

$$1024k^2 - 36(900 - 16k^2) < 0$$

$$1024k^2 - 32400 + 576k^2 < 0$$

$$1600k^2 < 32400$$

$$16k^2 < 324 \quad |k| < \frac{9}{2}$$

$$4k^2 < 81$$

$$k^2 < \frac{81}{4}$$

$$k \in \left(-\frac{9}{2}; \frac{9}{2} \right)$$