Урок, группа 2

$$U = 2x^2 + 12xy + 32y^2 + 15 \;;\; x^2 + 16y^2 = 64$$

$$L(x,y,\lambda) = 2x^2 + 12xy + 32y^2 + 15 + \lambda(x^2 + 16y^2 - 64)$$

$$\begin{cases} L'_x = 4x + 12y + \lambda 2x = 0 \\ L'_y = 12x + 64y + \lambda 32y = 0 \\ L'_\lambda = x^2 + 16y^2 - 64 = 0 \end{cases}$$

$x_1 = -4\sqrt{2}$; $x_2 = -4\sqrt{2}$; $x_3 = 4\sqrt{2}$; $x_4 = 4\sqrt{2}$

$y_1 = -\sqrt{2}$; $y_2 = \sqrt{2}$; $y_3 = \sqrt{2}$; $y_4 = \sqrt{2}$

$\lambda_1 = -\frac{7}{2}$; $\lambda_2 = -\frac{1}{2}$; $\lambda_3 = -\frac{1}{2}$; $\lambda_4 = -\frac{7}{2}$

$\left(-4\sqrt{2}; -\sqrt{2}; -\frac{7}{2}\right)$ – max

$\left(-4\sqrt{2}; \sqrt{2}; -\frac{1}{2}\right)$ – min

$\left(4\sqrt{2}; -\sqrt{2}; -\frac{1}{2}\right)$ – min

$\left(4\sqrt{2}; \sqrt{2}; -\frac{7}{2}\right)$ – max

$(-\lambda(-2)) \cdot \underbrace{(x^2 + 16y^2)}_{64}$

$$\begin{cases} L''_{xx} = 4 + 2\lambda \\ L''_{yy} = 64 + 32\lambda \\ L''_{\lambda\lambda} = 0 \end{cases} \quad \begin{cases} L''_{xy} = L''_{yx} = 12 \\ L''_{x\lambda} = L''_{\lambda x} = 2x \\ L''_{y\lambda} = L''_{\lambda y} = 32y \end{cases} \rightarrow \begin{vmatrix} 0 & 2x & 32y \\ + & - & + \\ 2x & (4+2\lambda) & 12 \\ - & + & - \\ 32y & 12 & (64+32\lambda) \\ + & - & + \end{vmatrix}$$