Ponad to $1-\bar{y}-2\alpha\bar{x} = 1-\frac{1-\alpha}{1+\alpha^2}-\frac{2\alpha+2\alpha^2}{1+\alpha^2} = 1-\frac{1+\alpha+2\alpha^2}{1+\alpha^2}$

$$= \frac{\cancel{1}+\alpha^2-\cancel{1}-\alpha-2\alpha^2}{1+\alpha^2} = -\alpha\frac{1+\alpha}{1+\alpha^2} = -\alpha\bar{x}$$

$$-1+\bar{x}-2\alpha\bar{y} = -1+\frac{1+\alpha}{1+\alpha^2}-2\alpha\frac{1-\alpha}{1+\alpha^2} =$$

$$= -1+\frac{1-\alpha+2\alpha^2}{1+\alpha^2} = \frac{-\alpha+\alpha^2}{1+\alpha^2} = \alpha\frac{\alpha-1}{1+\alpha^2}$$

$$= -\alpha\bar{y}$$

$$\begin{vmatrix} -\alpha\bar{x}-\lambda & -\bar{x} \\ \bar{y} & -\alpha\bar{y}-\lambda \end{vmatrix} = (\alpha\bar{x}+\lambda)(\alpha\bar{y}+\lambda)+\bar{x}\bar{y} =$$

$$= \alpha^2\bar{x}\bar{y}+\lambda\alpha(\bar{x}+\bar{y})+\lambda^2+\bar{x}\bar{y} = 0$$

$$\Delta = \alpha^2(\bar{x}+\bar{y})^2-4(\alpha^2+1)\bar{x}\bar{y}$$

$$= \alpha^2(\bar{x}-\bar{y})^2-4\bar{x}\bar{y} =$$

~~Pytanie:~~ $= \alpha^2\left(\frac{1+\alpha-1+\alpha}{1+\alpha^2}\right)^2-4\frac{1-\alpha^2}{(1+\alpha^2)^2}$

$$= \alpha^2\frac{(2\alpha)^2}{(1+\alpha^2)^2}-4\frac{1-\alpha^2}{(1+\alpha^2)^2}$$

$$= \frac{4\alpha^4+4\alpha^2-4}{(1+\alpha^2)^2} = \frac{4(\alpha^4+\alpha^2-1)}{(1+\alpha^2)^2}$$

Pytanie: Czy $\operatorname{Re}\left(\frac{-\alpha(\bar{x}+\bar{y})\pm\frac{2}{1+\alpha^2}\sqrt{\alpha^4+\alpha^2-1}}{2}\right) \overset{?}{<} 0$

Wolfram tw. że to prawda dla $\alpha\in[0,1)$.

Dla $\alpha=0$ podstawowa wersja Lotki-Volterry.