CalcNT 2019w
Lec 04

I

$$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} 1 & -1 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} \xi \\ \eta \end{pmatrix} = \frac{1}{\sqrt{2}} \begin{pmatrix} \xi - \eta \\ \xi + \eta \end{pmatrix}$$

から $\quad x + y = \sqrt{2}\,\xi, \quad xy = \frac{1}{2}(\xi^2 - \eta^2)$ となるので

$$\begin{aligned} x^2 + 3xy + y^2 &= (x+y)^2 + xy \\ &= 2\xi^2 + \frac{1}{2}(\xi^2 - \eta^2) \\ &= \frac{5}{2}\xi^2 - \frac{1}{2}\eta^2 \end{aligned}$$

となる. よって曲線は回転座標変換で

$$\frac{5}{2}\xi^2 - \frac{1}{2}\eta^2 = 1$$

と表される.

II

$$\left(\begin{pmatrix} a & c \\ c & b \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}, \begin{pmatrix} x \\ y \end{pmatrix} \right) = \left(\begin{pmatrix} ax + cy \\ cx + by \end{pmatrix}, \begin{pmatrix} x \\ y \end{pmatrix} \right)$$

$$= x(ax + cy) + y(cx + by)$$

$$= ax^2 + 2cxy + by^2$$