$E' = \{(x_1, x_2, K(\alpha_{11}-\alpha_{10})x_1, K(\alpha_{12}-\alpha_{10})x_2)\} - \{(0,0,*,*)\}$ $(*,*) \neq 0$

v_2 intersect with E' at $(0.0.0.0)$

①

$$\lim_{h\to 0} \frac{(0,0,0,0) - (0,h,0,k_2 h)}{h}$$

$$= -(0,1,0,-k_2).$$

②

$$\lim_{h\to 0} \frac{(0,0,0,0) - (h,0,k_1 h,0)}{h} = -(1,0,k_1,0)$$

③ $\operatorname{im} v_{2*} = \left\langle \begin{matrix} (1,0,\alpha_{21}-\alpha_{20},0) \\ (0,1,0,\alpha_{22}-\alpha_{20}) \end{matrix} \right\rangle$

$$\det\begin{pmatrix} 1 & 0 & k_1 & 0 \\ 0 & 1 & 0 & k_2 \\ 1 & 0 & \alpha_{21}-\alpha_{20} & 0 \\ 0 & 1 & 0 & \alpha_{22}-\alpha_{20} \end{pmatrix} = \begin{vmatrix} 1 & 0 & k_1 & 0 \\ 0 & 1 & 0 & k_2 \\ 0 & 0 & \alpha_{21}-\alpha_{20}-k_1 & 0 \\ 0 & 0 & 0 & \alpha_{22}-\alpha_{20}-k_2 \end{vmatrix}$$

$= (\alpha_{21}-\alpha_{20}-k_1)(\alpha_{22}-\alpha_{20}-k_2) \neq 0$ for sufficiently small k_1, k_2

$\Rightarrow T_0 E' + \operatorname{im} v_{2*} = T_0 \mathbb{C}^4$

$\Rightarrow v_2$ meets with E' at $(0.0.0.0)$ transversely.

In general, observe the following:

$$v_1 = (\alpha_{11}-\alpha_{10})x_1\frac{\partial}{\partial x_1} + \cdots + (\alpha_{1n}-\alpha_{10})x_n\frac{\partial}{\partial x_n}$$
$$v_2 = (\alpha_{21}-\alpha_{20})x_1\frac{\partial}{\partial x_1} + \cdots + (\alpha_{2n}-\alpha_{20})x_n\frac{\partial}{\partial x_n}$$
$$\vdots \qquad\qquad\qquad \vdots$$
$$v_q = (\alpha_{q1}-\alpha_{q0})x_1\frac{\partial}{\partial x_1} + \cdots + (\alpha_{qn}-\alpha_{q0})x_n\frac{\partial}{\partial x_n}.$$

$\Rightarrow E' = \langle v_1, \cdots v_q \rangle$ is locally $\mathbb{C}^n \times \mathbb{C}^q$.