③ $l = i-2$. $\Rightarrow \dim(V_{n-i+2} \cap \Lambda) = k-i+2 = k-l$.

(i) $\sigma_1, \cdots \sigma_{i-2}$ are linearly independent.

$$\Rightarrow \begin{aligned} \sigma_1 &= \sigma_1 + 0 \\ \sigma_2 &= 0 + \sigma_2 \\ &\vdots \\ \sigma_{i-2} &= 0 + \cdots \quad \sigma_{i-2} \\ &\vdots \end{aligned}$$

$$\Rightarrow L(\alpha) = \Lambda = \left\langle \left(\begin{array}{cccc|c|cc} 1, & 0 & \cdots & & 0 & & \\ 0, & 1 & \cdots & & 0 & & \\ \vdots & & & & & & \\ i-2\ 0, & 0 & \cdots & & 1 & & \\ 0 & 0 & \cdots & & 0 & * & * \\ 0 & 0 & \cdots & & 0 & * & * \\ \hline 0 & & & & & & \\ \vdots & & 0 & & & & \end{array} \right) \right\rangle$$

$i-2, i-1, i$ $\quad$ $k-l$ $\quad$ $k-l$

$\Rightarrow \dim(V_{n-i+3} \cap \Lambda) \geq k-l+1 = k-(i-2)+1 = k-i+3$

(ii) $\sigma_2, \cdots \sigma_{i-1}$ are linearly indepent and we can not replace σ_{i-1} by σ_1.

$\Rightarrow \sigma_1 = * \sigma_2 + \cdots + * \sigma_{i-2} + 0\, \sigma_{i-1}$, i.e. when we express σ_1 as a linear combination of $\sigma_2, \cdots \sigma_{i-1}$, the coefficient of σ_{i-1} is zero. Otherwise we can replace σ_{i-1} by σ_1.

$$\Rightarrow \begin{aligned} \sigma_1 &= * \sigma_2 + \cdots + * \sigma_{i-2} + 0\, \sigma_{i-1} + 0 \\ \sigma_2 &= \sigma_2 + \cdots \\ &\vdots \\ \sigma_{i-1} &= 0 + \cdots + \sigma_{i-1} + 0 \cdots \\ &\vdots \\ & \quad 0 \end{aligned}$$

$i-2, i-1, i$