we may rewrite the conditions (**) as $\Lambda\wedge\Lambda=0$.

⌈ We have only to prove that for $v^* = e^*_\alpha$, each α.

$(i(e^*_\alpha)\Lambda)\wedge\Lambda = \frac{1}{2} i(e^*_\alpha)(\Lambda\wedge\Lambda)$, by the linearity.

LHS =

$(i(e^*_\alpha)(\lambda_{ij} e_i\wedge e_j))\wedge \lambda_{i'j'} e_{i'}\wedge e_{j'}$

$= \lambda_{\alpha j} e_j \wedge \lambda_{i'j'} e_{i'}\wedge e_{j'} - \lambda_{i\alpha} e_i \wedge \lambda_{i'j'} e_{i'}\wedge e_{j'}$

$= \lambda_{\alpha j} e_j \wedge \lambda_{\beta r} e_\beta \wedge e_r + \lambda_{\alpha i} e_i \wedge \lambda_{\beta r} e_\beta \wedge e_r$

$= 2\lambda_{\alpha i} e_i \wedge \lambda_{\beta r} e_\beta \wedge e_r = 2\lambda_{\alpha i}\lambda_{\beta r} e_i\wedge e_\beta\wedge e_r$

2 RHS $= i(e^*_\alpha)(\lambda_{ij}\lambda_{\beta r} e_i\wedge e_j\wedge e_\beta\wedge e_r)$

$= \lambda_{\alpha j}\lambda_{\beta r} e_j\wedge e_\beta\wedge e_r - \lambda_{i\alpha}\lambda_{\beta r} e_i\wedge e_\beta\wedge e_r$

$+ \lambda_{ij}\lambda_{\alpha r} e_i\wedge e_j\wedge e_r - \lambda_{ij}\lambda_{\beta\alpha} e_i\wedge e_j\wedge e_\beta$

$= 2\lambda_{\alpha i}\lambda_{\beta r} e_i\wedge e_\beta\wedge e_r$

$+ 2\lambda_{ij}\lambda_{\alpha r} e_i\wedge e_j\wedge e_r$

$= 4\lambda_{\alpha i}\lambda_{\beta r} e_i\wedge e_\beta\wedge e_r$

$\Rightarrow$ LHS = RHS.

By (**), $(i(v^*)\Lambda)\wedge\Lambda = \frac{1}{2} i(v^*)(\Lambda\wedge\Lambda) = 0$

$\Rightarrow$

$i(e^*_\alpha)(\Lambda\wedge\Lambda) = 0 \quad \Rightarrow \quad \Lambda\wedge\Lambda = 0$

for $\Lambda\wedge\Lambda = a_I e_I$

$\Rightarrow i(e^*_\alpha)(a_I e_I) = a_I\, i(e^*_\alpha)(e_I) = 0$

$\Rightarrow \{i(e^*_\alpha)(e_I)\}$ is linearly indepent set if we eliminate $i(e^*_\alpha)(e_I)=0$.

$\Rightarrow a_I = 0$ in case $i(e^*_\alpha)(e_I)\neq 0$. ⌋