baza $(l, n, m, \bar{m})$ $\quad l \cdot n = 1 \quad m \cdot \bar{m} = -1$

$$v = v^1 l + v^2 n + v^3 m + v^4 \bar{m}$$

$v^1 = v \cdot n \quad v^2 = l \cdot v \quad v^3 = -v \cdot \bar{m} \quad v^4 = -m \cdot v$

$v^2 = v \cdot v = v^1 v^2 l \cdot n + v^2 v^1 n \cdot l + v^3 v^4 m \cdot \bar{m} + v^4 v^3 \bar{m} \cdot m = 2 v^1 v^2 - 2 v^3 v^4$

Niech $k = a_1 l + a_2 n + a_3 m + a_4 \bar{m} \qquad a_i \in \mathbb{R}$

k - zerowy, więc $0 = k \cdot k = 2 a_1 a_2 - 2 a_3 a_4 \Rightarrow a_1 a_2 = a_3 a_4$ (1)

k - niezmniejszy z l, więc $k \neq a l$

$$\rho(k) = -\frac{k \cdot \bar{m}}{k \cdot l} = -\frac{-a_3}{a_2} = \frac{a_3}{a_2}$$

$$-\frac{k \cdot n}{k \cdot m} = -\frac{a_1}{-a_4} = \frac{a_1}{a_4}$$

z (1) wynika, że $\frac{a_3}{a_2} = \frac{a_1}{a_4}$ ▨

$\bar{\rho}(k) \stackrel{?}{=} -\frac{k \cdot m}{k \cdot l} = \frac{a_4}{a_2} = -\frac{k \cdot n}{k \cdot \bar{m}} = \frac{a_1}{a_3}$

$$(k \cdot l)\left(n + \rho \bar{\rho} l + \rho m + \bar{\rho} \bar{m}\right) = a_2 \left(n + \frac{a_3}{a_2} \frac{a_1}{a_3} l + \frac{a_3}{a_2} m + \frac{a_4}{a_2} \bar{m}\right) =$$

$$= a_1 l + a_2 n + a_3 m + a_4 \bar{m} = k$$ ▨