#1.4 $|a\rangle \in V$ basis $\mathcal{B} = \{|a_1\rangle |a_2\rangle \dots |a_n\rangle\}$

$|a\rangle = \sum_i \alpha_i |a_i\rangle$ prove $\{\alpha_i\}$ is unique

assume that α_i is not unique thus:

$$|a\rangle = \sum_i \beta_i |a_i\rangle$$

$$|0\rangle = \sum_i \alpha_i |a_i\rangle - \sum_i \beta_i |a_i\rangle$$

$$= \sum_i (\alpha_i - \beta_i) |a_i\rangle \Rightarrow \alpha_i - \beta_i = 0$$

$$\alpha_i = \beta_i$$

#1.13

$$\int_{-\infty}^{+\infty} e^{-t^4} (t^{10} - t^6 + 5t^4 - 5)\, dt$$

$$\leq \sqrt{\int_{-\infty}^{+\infty} (t^4 - 1)^2 e^{-t^4} dt} \cdot \sqrt{\int_{-\infty}^{+\infty} (t^6 + 5)^2 e^{-t^4} dt}$$