

14.2

(14.11)より

$$E_{COM} = E_{\alpha} \left[\left\{ \frac{1}{M} \sum_{m=1}^M \varepsilon_m(\alpha) \right\}^2 \right]$$

$$= \frac{1}{M^2} E_{\alpha} \left[(\varepsilon_1(\alpha) + \dots + \varepsilon_M(\alpha))^2 \right]$$

$$= \frac{1}{M^2} E_{\alpha} \left[\varepsilon_1^2(\alpha) + \dots + \varepsilon_M^2(\alpha) + \varepsilon_1(\alpha)\varepsilon_2(\alpha) + \dots + \varepsilon_M(\alpha)\varepsilon_{M-1}(\alpha) \right]$$

$$= \frac{1}{M^2} \left\{ E_{\alpha} [\varepsilon_1^2(\alpha)] + \dots + E_{\alpha} [\varepsilon_M^2(\alpha)] + \underbrace{E_{\alpha} [\varepsilon_1(\alpha)\varepsilon_2(\alpha)] + \dots + E_{\alpha} [\varepsilon_M(\alpha)\varepsilon_{M-1}(\alpha)]}_{0 \text{ (14.13)より}} \right\}$$

$$= \frac{1}{M^2} \sum_{m=1}^M E_{\alpha} [\varepsilon_m^2(\alpha)]$$

$$= \frac{1}{M} E_{AV} \quad \leftarrow (14.10) \text{より}$$

となり、(14.14)を得る。(問題文の(14.12)は使わない)