

9.26

(9.18) F1)

$$\begin{aligned} N_k^{\text{new}} &= \gamma^{\text{old}}(z_{1k}) + \gamma^{\text{old}}(z_{2k}) + \dots + \gamma^{\text{new}}(z_{mk}) + \dots + \gamma^{\text{old}}(z_{Nk}) \\ &= \sum_{n=1}^N \gamma^{\text{old}}(z_{nk}) - \gamma^{\text{old}}(z_{mk}) + \gamma^{\text{new}}(z_{mk}) \\ &= N_k^{\text{old}} - \gamma^{\text{old}}(z_{mk}) + \gamma^{\text{new}}(z_{mk}) \quad \dots (9.79) \end{aligned}$$

を得る。

(9.17) F1)

$$\begin{aligned} \mu_k^{\text{new}} &= \frac{1}{N_k^{\text{new}}} \left\{ \gamma^{\text{old}}(z_{1k}) \alpha_1 + \gamma^{\text{old}}(z_{2k}) \alpha_2 + \dots + \gamma^{\text{new}}(z_{mk}) \alpha_m + \dots + \gamma^{\text{old}}(z_{Nk}) \alpha_N \right\} \\ &= \frac{1}{N_k^{\text{new}}} \left\{ \sum_{n=1}^N \gamma^{\text{old}}(z_{nk}) \alpha_n - \gamma^{\text{old}}(z_{mk}) \alpha_m + \gamma^{\text{new}}(z_{mk}) \alpha_m \right\} \\ &= \frac{1}{N_k^{\text{new}}} \left\{ N_k^{\text{old}} \mu_k^{\text{old}} - \gamma^{\text{old}}(z_{mk}) \alpha_m + \gamma^{\text{new}}(z_{mk}) \alpha_m \right\} \\ &= \frac{1}{N_k^{\text{new}}} \left[\left\{ N_k^{\text{new}} + \gamma^{\text{old}}(z_{mk}) - \gamma^{\text{new}}(z_{mk}) \right\} \mu_k^{\text{old}} - \gamma^{\text{old}}(z_{mk}) \alpha_m + \gamma^{\text{new}}(z_{mk}) \alpha_m \right] \\ &= \frac{1}{N_k^{\text{new}}} \left[N_k^{\text{new}} \mu_k^{\text{old}} - \left\{ \gamma^{\text{new}}(z_{mk}) - \gamma^{\text{old}}(z_{mk}) \right\} \mu_k^{\text{old}} + \left\{ \gamma^{\text{new}}(z_{mk}) - \gamma^{\text{old}}(z_{mk}) \right\} \alpha_m \right] \\ &= \mu_k^{\text{old}} + \frac{1}{N_k^{\text{new}}} \left\{ \gamma^{\text{new}}(z_{mk}) - \gamma^{\text{old}}(z_{mk}) \right\} (\alpha_m - \mu_k^{\text{old}}) \quad \dots (9.78) \end{aligned}$$

を得る。