

附錄 B：(3.3.4)式的證明

$$\begin{aligned}\text{殘差向量 } \tilde{e} &= Y - \bar{Y} \cdot 1 - X\tilde{\beta} \\ &= Y - \bar{Y} \cdot 1 - XV_s A_s \hat{\gamma}_s\end{aligned}$$

$$\text{配適值向量} = \bar{Y} \cdot 1 + XV_s A_s \hat{\gamma}_s$$

殘差向量 \perp 配適值向量

$$\Leftrightarrow (Y - \bar{Y} \cdot 1 - X\tilde{\beta})' (\bar{Y} \cdot 1 + XV_s A_s \hat{\gamma}_s) = 0$$

$$\Leftrightarrow \hat{\gamma}_s' A_s V_s' X' Y - \hat{\gamma}_s' A_s V_s' X' XV_s A_s \hat{\gamma}_s = 0$$

$$\Leftrightarrow \hat{\gamma}_s' A_s \Lambda_s \hat{\gamma}_s - \hat{\gamma}_s' A_s \Lambda_s A_s \hat{\gamma}_s = 0$$

$$\Leftrightarrow \hat{\gamma}_s' (A_s \Lambda_s - A_s \Lambda_s A_s) \hat{\gamma}_s = 0$$