Uncoupled error dynamics

$$\begin{bmatrix} e_{\delta_v}[k+1] \\ e_{w1}[k+1] \\ e_{w2}[k+1] \end{bmatrix} = \begin{bmatrix} \lambda_c - \ell_1 & -k_c & -bk_c \\ \ell_2 & 1+\beta & -\beta \\ -\ell_3 & 1 & 0 \end{bmatrix} \begin{bmatrix} e_{\delta_v}[k] \\ e_{w1}[k] \\ e_{w2}[k] \end{bmatrix}$$

Observer gains:

$$\ell_1 = \lambda_c + (1+\beta) - 3\lambda_e$$

$$\ell_2 = \frac{b(\lambda_e - 1)^3 - \beta(b+1)(\beta^2 - 3\beta\lambda_e + \beta + 3\lambda_e^2 - 3\lambda_e + 1)}{k_c(b+1)(b+\beta)}$$

$$\ell_3 = \frac{-(b+\beta)(\beta^2 - 3\beta\lambda_e + \beta + 3\lambda_e^2 - 3\lambda_e + 1) - \lambda_e^3}{k_c(b+1)(b+\beta)}$$