The model used in the Sims (2002) paper is written as

$$\begin{aligned} w(t) &= \frac{1}{3}E_t\left[W(t)+W(t+1)+W(t+2)\right]-\alpha(u(t)-u_n)+\nu(t) \\ W(t) &= \frac{1}{3}(w(t)+w(t-1)+w(t-2)) \\ u(t) &= \theta u(t-1)+\gamma W(t)+\mu+\varepsilon(t) \end{aligned}$$

where $\nu(t), \varepsilon(t)$ are exogenous innovations. Now we have to rewrite this system of equations such that it fits into the canonical form

$$\Gamma_0 y(t) = \Gamma_1 y(t-1) + C + \Psi z(t) + \Pi\eta(t).$$

Sims (2002) defines the state vector

$$y(t) = \begin{pmatrix} w(t) \\ w(t-1) \\ W(t) \\ u(t) \\ E_t W(t+1) \end{pmatrix}.$$

Shifting the first equation one period backwards and rearranging yields

$$\frac{1}{3}E_{t-1}W(t)+\frac{1}{3}E_{t-1}W(t+1) = w(t-1)-\frac{1}{3}W(t-1)+\alpha u(t-1)-\alpha u_n - v(t-1).$$

If we define $\eta_1(t) = W(t) - E_{t-1}W(t)$ and $\eta_2(t) = E_t W(t+1) - E_{t-1}W(t+1)$ then follows

$$\frac{1}{3}\left[W(t)-\eta_1(t)\right]+\frac{1}{3}\left[E_t W(t+1)-\eta_2(t)\right] = w(t-1)-\frac{1}{3}W(t-1)+\alpha u(t-1)-\alpha u_n - v(t-1) \tag{1}$$

$$\Leftrightarrow \underline{\underline{\frac{1}{3}W(t)+\frac{1}{3}E_t W(t+1) = w(t-1)-\frac{1}{3}W(t-1)+\alpha u(t-1)-\alpha u_n - v(t-1)+\frac{1}{3}\eta_1(t)+\frac{1}{3}\eta_2(t)}}$$

From the second and third equation of the model we obtain

$$-\frac{1}{3}w(t)-\frac{1}{3}w(t-1)+W(t) = \frac{1}{3}w(t-2) \tag{2}$$

$$u(t)-\gamma W(t) = \theta u(t-1)+\mu+\varepsilon(t). \tag{3}$$

Finally, we have to add to the system the definitions for the auxiliary variables

$$w(t-1) = w(t-1) \tag{4}$$

$$W(t) = E_{t-1}W(t)+\eta_1(t) \tag{5}$$

Now we can cast eq. (1)-(5) into the canonical form

$$\Gamma_0 y(t) = \Gamma_1 y(t-1) + C + \Psi z(t) + \Pi\eta(t)$$

which gives

$$\begin{pmatrix} 0 & 0 & \frac{1}{3} & 0 & \frac{1}{3} \\ -\frac{1}{3} & -\frac{1}{3} & 1 & 0 & 0 \\ 0 & 0 & -\gamma & 1 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \end{pmatrix} \begin{pmatrix} w(t) \\ w(t-1) \\ W(t) \\ u(t) \\ E_t W(t+1) \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 0 & -\frac{1}{3} & \alpha & 0 \\ 0 & \frac{1}{3} & 0 & 0 & 0 \\ 0 & 0 & 0 & \theta & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} w(t-1) \\ w(t-2) \\ W(t-1) \\ u(t-1) \\ E_{t-1}W(t) \end{pmatrix} + \begin{pmatrix} -\alpha \cdot u_n \\ 0 \\ \mu \\ 0 \\ 0 \end{pmatrix} + \begin{pmatrix} -1 & 0 \\ 0 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{pmatrix} \begin{pmatrix} v(t-1) \\ \varepsilon(t) \end{pmatrix} + \begin{pmatrix} \frac{1}{3} & \frac{1}{3} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} \eta_1(t) \\ \eta_2(t) \end{pmatrix}$$