(c) State equations:

$$\begin{Bmatrix} \dot{e}_a \\ \dot{i}_a \\ \dot{\theta}_m \\ \dot{\omega}_m \\ \dot{\theta}_L \\ \dot{\omega}_L \end{Bmatrix} = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{L_a} & -\frac{R_a}{L_a} & 0 & -\frac{K_b}{L_a} & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & \frac{K_t}{J_m} & -\frac{k}{J_m} & 0 & \frac{k}{J_m} & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & \frac{k}{J_L} & 0 & -\frac{k}{J_L} & -\frac{B_L}{J_L} \end{bmatrix} \begin{Bmatrix} e_a \\ i_a \\ \theta_m \\ \omega_m \\ \theta_L \\ \omega_L \end{Bmatrix} + \begin{bmatrix} -\frac{1}{R_i C_f} & -\frac{R_f}{R_i} \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{Bmatrix} e_{in} \\ \dot{e}_{in} \end{Bmatrix}$$

Output equations:

$$\begin{Bmatrix} i_a \\ \theta_L \\ \omega_L \\ \alpha_L \\ T_L \end{Bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & \frac{k}{J_L} & 0 & -\frac{k}{J_L} & -\frac{B_L}{J_L} \\ 0 & 0 & k & 0 & -k & -B_L \end{bmatrix} \begin{Bmatrix} e_a \\ i_a \\ \theta_m \\ \omega_m \\ \theta_L \\ \omega_L \end{Bmatrix} + \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{bmatrix} \begin{Bmatrix} e_{in} \\ \dot{e}_{in} \end{Bmatrix}$$