هدف: شبیه سازی adaptive observer با استفاده از معادلات زیر:

$$\dot{\hat{\boldsymbol{y}}} = \boldsymbol{\alpha}(\boldsymbol{y},\boldsymbol{u},t) + \boldsymbol{\beta}(\boldsymbol{y},\boldsymbol{u},t)\hat{\boldsymbol{\theta}} - k_y(\hat{\boldsymbol{y}} - \boldsymbol{y}); \quad \text{for any scalar} \quad k_y > 0$$
$$\dot{\hat{\boldsymbol{\theta}}} = -k_\theta \boldsymbol{\beta}(\boldsymbol{y},\boldsymbol{u},t)'(\hat{\boldsymbol{y}} - \boldsymbol{y}); \quad \text{for any scalar} \quad k_\theta > 0 \qquad (18)$$

با استفاده از مقادیر زیر:

$$\dot{y}_1 = \frac{a_1}{L_e}u_1 - a_1(y_1^2\theta_1 + \frac{\theta_2}{L_e}),$$
$$\dot{y}_2 = \frac{a_1}{L - L_e}u_2 - a_1(y_2^2\theta_1 + \frac{\theta_2}{L - L_e}), \qquad (19)$$

with output $\boldsymbol{y} = \begin{pmatrix} Q(0) & Q(L) \end{pmatrix}'$, input $\boldsymbol{u} = \begin{pmatrix} H(0) & H(L) \end{pmatrix}'$, and the unknown vector $\theta = \begin{pmatrix} \wp & H(L_e) \end{pmatrix}'$.

According to (18), by considering

$$\boldsymbol{\alpha}(\boldsymbol{y},\boldsymbol{u},t) = \begin{pmatrix} \frac{a_1}{L_e}u_1 \\ -\frac{a_1}{L-L_e}u_2 \end{pmatrix} \text{ and } \boldsymbol{\beta}(\boldsymbol{y},t) = \begin{pmatrix} -a_1 y_1^2 & -\frac{a_1}{L_e} \\ -a_1 y_2^2 & \frac{a_1}{L-L_e} \end{pmatrix},$$

$$k_y = 5 \text{ and } k_\theta = 10^8$$

با استفاده از این معادلات باید بتوان $\hat{H}(L_e)$ and $\hat{\wp}$ را بدست آورد