

淡江大學八十八學年度碩士班招生考試試題

系別：電機工程學系

科目：控制系統

本試題共 1 頁

一、 Find the sensitivity of the steady-state error to changes in parameter K and parameter a for the system shown in Figure 1, with a step input.

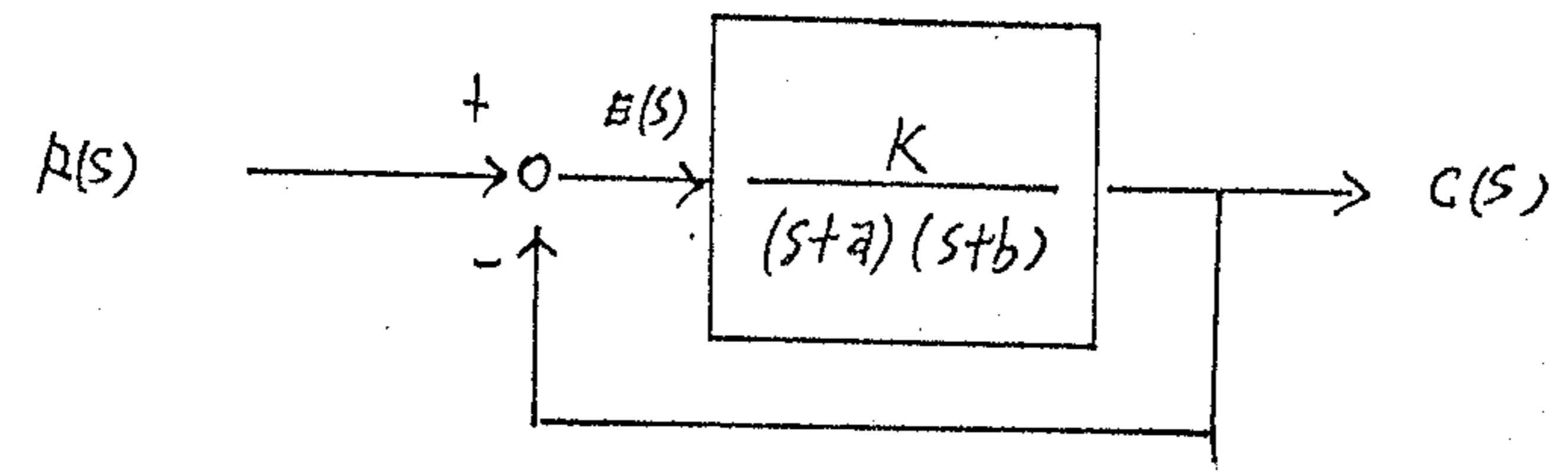


Figure 1.

二、 Find the transfer function, $\frac{\theta(s)}{E_f(s)}$ of the field-controlled dc motor shown in Figure 2.

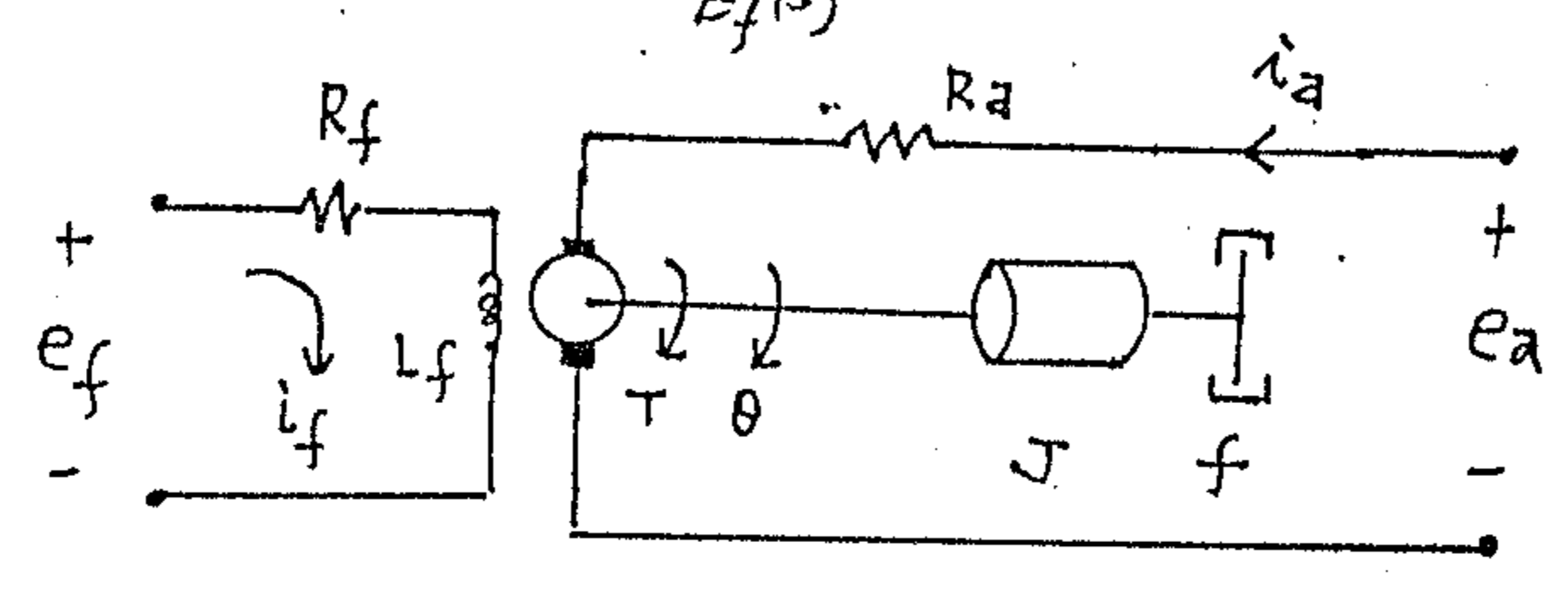


Figure 2.

三、 Represent the feedback control system shown in Figure 3 in signal flow graph and state space.

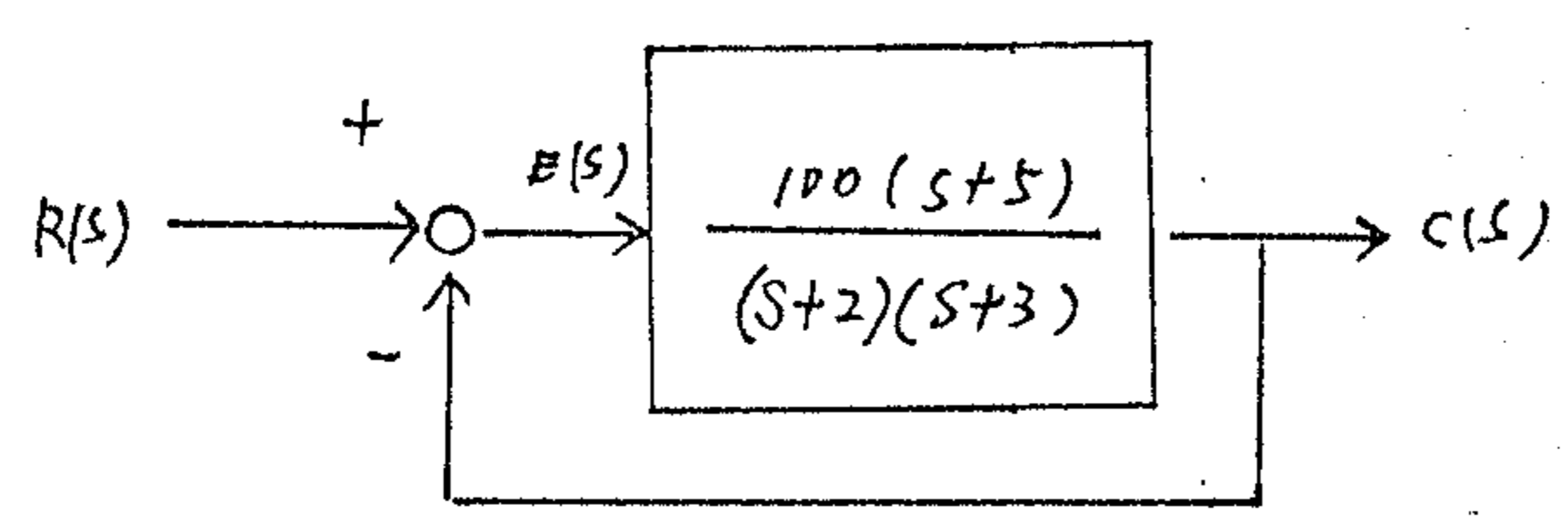


Figure 3.

四、 Represent the system, $\ddot{y} + 6\dot{y} + 11y = 6u$, in state vector-matrix notation and block-diagram.

五、 Show that the following quadratic form is positive definite:

$$Q(x_1, x_2) = 10x_1^2 + 4x_2^2 + x_3^2 + 2x_1x_2 - 2x_2x_3 - 4x_1x_3.$$