

# FRTN15 Predictive Control—Exercise 6

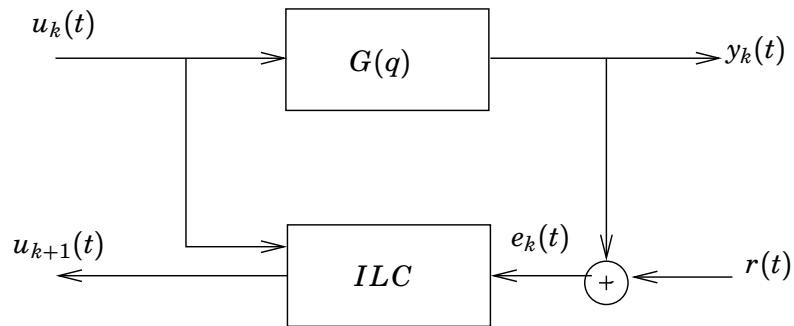
1. Consider the system

$$G(q) = \frac{0.09516}{q - 0.9048}.$$

It is controlled using ILC (see Figure 1) such that the control signal at an iteration  $k$  is given by:

$$u_{k+1}(t) = u_k(t) + L(q)e_k(t)$$

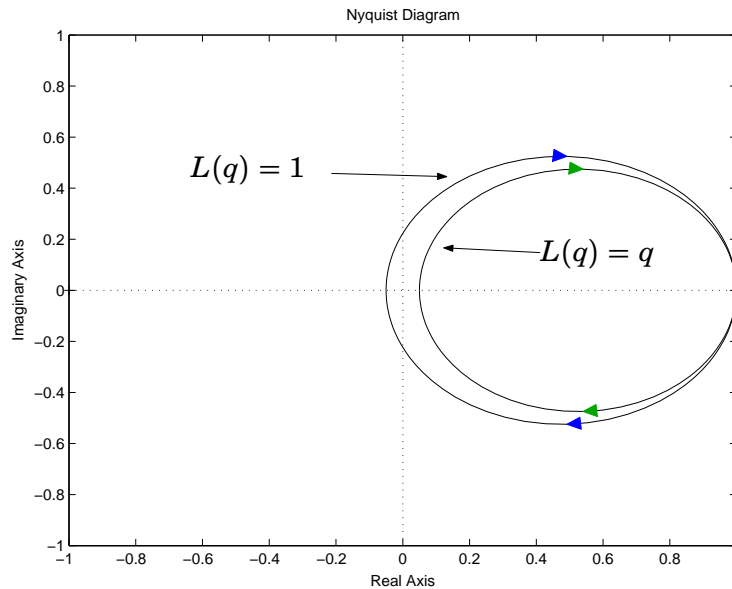
where  $e_k(t) = r(t) - y_k(t)$ .



**Figure 1** AN ILC feedback system.

Study the convergence of the ILC iterations for  $L(q) = 1$  and  $L(q) = q$ .

*Hint:* The Nyquist plots of  $G(q)L(q)$  for the two chosen  $L$  are shown in Figure 2.



**Figure 2** Nyquist plots for  $G(q)L(q)$ .