

## Additional Exercises for Chapter 7

1. We want to study absolute stability of the feedback connection of the transfer function

$$G(s) = \frac{1}{(s+1)^3}$$

and a time-invariant memoryless nonlinearity that belongs to the sector  $[0, k]$  for  $k > 0$ . The Nyquist and Popov plots are shown in Figure 1.

- (a) Using the circle criterion, find the largest  $k$  for which the system is absolutely stable.  
 (b) Using the Popov criterion, find the largest  $k$  for which the system is absolutely stable.

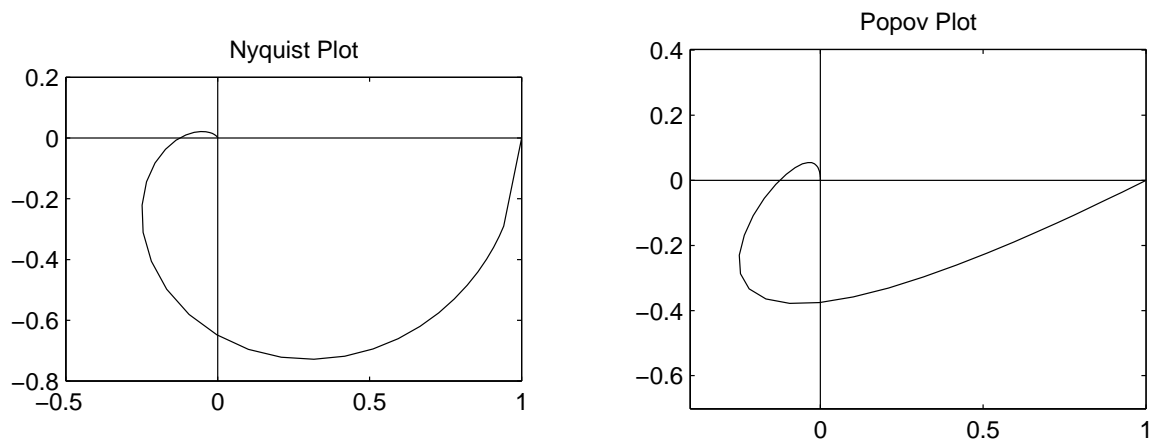


Figure 1: Exercise 1.