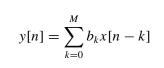


PROBLEM:

Consider a system defined by



- (a) Suppose that the input x[n] is non-zero only for $0 \le n \le N 1$; i.e., it has a support of N samples. Show that y[n] is non-zero at most over a finite interval of the form $0 \le n \le P - 1$. Determine P and the support of y[n] in terms of M and N.
- (b) Suppose that the input x[n] is non-zero only for $N_1 \le n \le N_2$. What is the support of x[n]? Show that y[n] is non-zero at most over a finite interval of the form $N_3 \le n \le N_4$. Determine N_3 and N_4 and the support of y[n] in terms of N_1 , N_2 , and M.

Hint: Draw a sketch similar to Fig. 5.5 to illustrate the zero regions of the output signal. McClellan, Schafer and Yoder, *Signal Processing First*, ISBN 0-13-065562-7. Prentice Hall, Upper Saddle River, NJ 07458. © 2003 Pearson Education, Inc.