

LECTURE 7

EXERCISE 1. ESTIMATION OF THE AUTOCORRELATION OF A SYSTEM OUTPUT

Do exercise 3.13 in the book.

EXERCISE 2. ESTIMATION OF THE PSD OF A SYSTEM OUTPUT

Do exercise 3.14a in the book.

EXERCISE 3. PRACTICAL IMPLEMENTATION IN MATLAB

Download the random process $x(t)$ [X.mat](#) and the LTI system [LTI1.m](#)

1. Estimate the autocorrelation of $x(t)$ using `xcorr`
2. Estimate the impulse response of LTI1
 - a. Hint make an impulse `imp=[1 zeros(1,50)];`
3. Use LTI1 to find the output $y(t)$ of LTI1 when the input is $x(t)$. Validate formula 3.140 by comparing the autocorrelation of y obtained using `Ryy=xcorr(y)` and the autocorrelation obtained using formula 3.140.
 - a. Hint a convolution in matlab can be done with the `conv` function for example: `Rxx*h` is done by `conv(Rxx,h,'same')`
 - b. In matlab a signal x is reversed as `x(end:-1:1)`