

Stochastic Modeling for Engineers
HW Project Number 5: Signals, Power Spectral Density and
Linear System Outputs

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1. Do problem 10.4.
2. Do problem 10.5.
3. Do problem 10.22.
4. Do problem 10.31.
5. Continue now on 10.31, assuming that the signals and systems operate in discrete time. Assume the input is a sequence of i.i.d. standard normal random variables. Assume both systems are as in Example 10.14 (First-Order Autoregressive) where α for h_1 is $3/4$ and α for h_2 is $1/4$.
 - Write out the joint PDF of the outputs $Y(0)$ and $W(2)$.
 - Calculate the probability that both $Y(0)$ and $W(2)$ are positive.
 - Estimate the probability calculated above by simulating Y and W by actually passing signals through the system.

Good Luck.