Assignment #4

1. Consider again the antenna-array and signal model of Problem 3 of Assignment #3.

   Fix the SNR of the user of interest at 12dB and the SNRs of the interferers at 10dB, 12dB, and 14dB. Run the normalized LMS, RLS, and Constant-Modulus (CM) algorithms (the latter is blind).

   Plot the beam pattern $10\log_{10}|y(\theta)|^2$ from -90^o to 90^o after 50, 250, and 1000 iterations (a total of 9 curves). Discuss your findings.

2. Design the minimum probability of error detector that operates on $b_n AT_b \mathbf{w}^H \mathbf{s}_\theta + v_n$.

   Give the complete derivation. Calculate the BER in the form of a $Q(\cdot)$ function ($Q(x) = \int_x^\infty \frac{1}{\sqrt{2\pi}} e^{-\frac{t^2}{2}} dt$). Evaluate the BER for the MF beamformer $\mathbf{w} = \mathbf{s}_\theta$.