Task 1:

Consider the second order AR process,

$$x(n) = -0.707x(n-1) - 0.25x(n-2) + v(n)$$

where $v(n)$ is i.i.d., $v(n) \sim N(0, 1)$

Consider the forward predictor

$$\hat{x}(n) = [w_1, w_2, ..., w_N][x(n-1), x(n-2), ..., x(n-N)]^T$$
$$= \mathbf{w}^T \mathbf{x}(n-1)$$

for N=1, 2 and 3. For each case, determine w_0 and J_{min}.

Use the SD, LMS, and NLMS to determine **w** for each case using at least two different step sizes. Plot single realizations and ensemble averages of weight values and prediction error.

Task 2:

Repeat the adaptive equalization experiment in section 9.7 using the NLMS algorithm.