1. Find the autocovariance and autocorrelation functions of the moving average process:

\[ x_t = w_t + 0.6w_{t-1} - 0.2w_{t-2} \]

where \( w_t \) is WN(0, \( \sigma^2 \)).

2. Write down the \( \phi(B) \) and the \( \theta(B) \) polynomials for each of the following models. Determine which models are causal and which are invertible.

(a) \( x_t + 0.2x_{t-1} - 0.48x_{t-2} = w_t \)
(b) \( x_t + 1.9x_{t-1} + 0.88x_{t-2} = w_t + 0.2w_{t-1} + 0.7w_{t-2} \)
(c) \( x_t + 0.6x_{t-1} = w_t + 1.2w_{t-1} \)
(d) \( x_t + 1.8x_{t-1} + 0.81x_{t-2} = w_t \)
(e) \( x_t + 1.6x_{t-1} = w_t - 0.4w_{t-1} + 0.04w_{t-2} \)

3. Find the poles and zeros associated with the following ARMA model, plotting them in the complex plane:

\[ x_t = 2.333x_{t-1} - 0.5x_{t-2} - 0.667x_{t-3} + 0.667x_{t-4} + w_t - 0.1w_{t-1} - 0.2w_{t-2} \]

Is this a causal model? Is it invertible?

4. For the causal processes in Problem 2, calculate the first six coefficients, \( \psi_i \), in the linear process representation of the model.

5. Calculate the first five autocovariances for an AR(2) process with:

(a) \( \phi_1 = 0.6 \) and \( \phi_2 = -0.2 \)
(b) \( \phi_1 = -0.6 \) and \( \phi_2 = 0.2 \)

6. Calculate the first five autocovariances for the ARMA model:

\[ x_t + 0.2x_{t-1} = w_t - 0.8w_{t-1} \]