Problem 1. Consider the AR(2) process $Y_t = 2 + 0.5Y_{t-1} + 0.4Y_{t-2} + u_t$.

(a) Is Y_t stationary?

(b) What is the unconditional mean of Y_t?

(c) Find the first two autocorrelations, and show how autocorrelations of higher lags are related to these two.

Problem 2. The ARMA(1,1) process is defined as $Y_t = \theta + \lambda Y_{t-1} + \alpha u_{t-1} + u_t$.

(a) Derive the auto-correlation function (ACF).

(b) If $\lambda = -\alpha$, what is the ACF of ARMA(1,1) at lag 1?