%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Exercise 2.1

% Simulate AR(2) process

% y\_{t} = 0.5 + 0.8 y\_{t-1} - 0.1 y\_{t-2} + epsilon\_{t}

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

% Simulation

AR2model = arima('Constant',0.5,'AR',{0.8 -0.1},'Variance',.01);

seed=1234;rng(seed);

AR2sim = simulate(AR2model,50); % 50 simulated values

% Figure

figure; plot(AR2sim, 'b->', 'LineWidth', 1.5);

legend('AR(2) Simulation','Location','southeast');

title('Simulated AR(2) Process','Fontsize',15);

xlabel('Time','Fontsize',15), ylabel('AR(2)','Fontsize',15);

set(gca,'FontSize',15);

%AR2simMulti= simulate(AR2model,50,'NumPaths',1000); % 1000 simulations of 50 simul. values

%figure, plot(AR2simMulti), xlim([0,50]), title('Simulated AR(2) Process')

% Estimate AR(2) model

AR2Mdl = arima(2,0,0);

AR2EstMdl = estimate(AR2Mdl,AR2sim);

%

% ARIMA(2,0,0) Model:

% --------------------

% Conditional Probability Distribution: Gaussian

%

% Standard t

% Parameter Value Error Statistic

% ----------- ----------- ------------ -----------

% Constant 0.537783 0.182914 2.94009

% AR{1} 0.79677 0.162236 4.91119

% AR{2} -0.118409 0.198151 -0.597568

% Variance 0.00989565 0.00172163 5.74785