

Time Series Pattern Recognition Exercize 4

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1 Exercize

Generate $N = 250$ time series data from the original AR model, and use 70% of them as training data and 30% as test data. Find the parameters of the correct AR model using the Yule-Walker method on the training data, and calculate the RMSE using the test data.

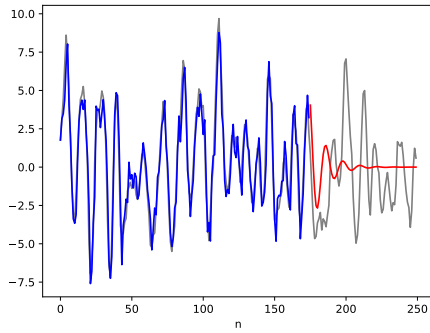
original AR model:

$$\text{AR}(2) : y_n = 0.9\sqrt{3}y_{n-1} - 0.81y_{n-2} + v_n$$

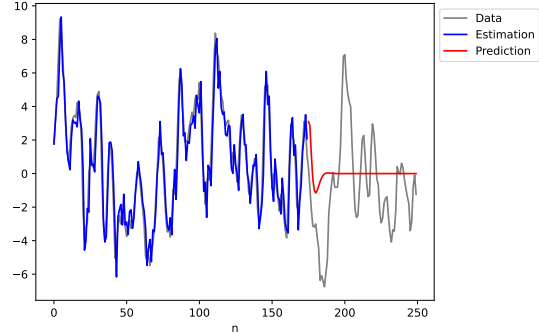
$$\text{AR}(3) : y_n = 0.9\sqrt{3}y_{n-1} - 0.81y_{n-2} + 0.1y_{n-3} + v_n$$

($v_n \sim \mathcal{N}(0, 1)$, $0.9\sqrt{3} = 1.5588457\dots$)

2 Plot original/estimate/predict Time series data



AR(2)



AR(3)

3 Parameters estimation result

	a_1	a_2	a_3	σ	RMSE
AR(2)	1.55636965	-0.80844474	-	1.01919896	2.802947316320934
AR(3)	1.58919026	-0.87456665	0.15284172	1.01232146	3.007201459880437