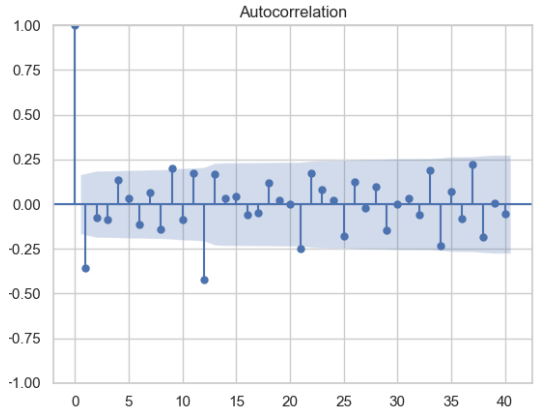
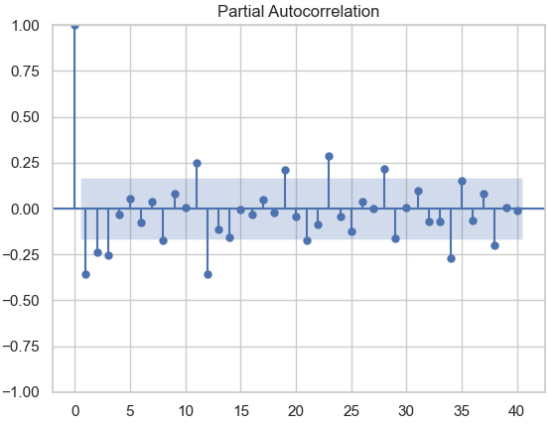
Question 1 (2 points) ✔ *Saved*

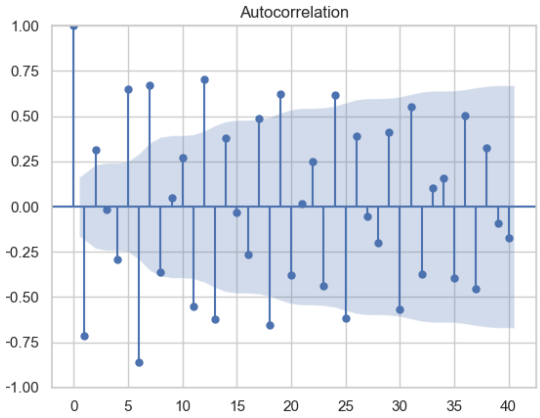
Show the sample autocorrelation function and the sample partial autocorrelation function up to 40 lags for C(t). Indicate which one of (A), (B), (C), (D) is the correct set of the sample functions.

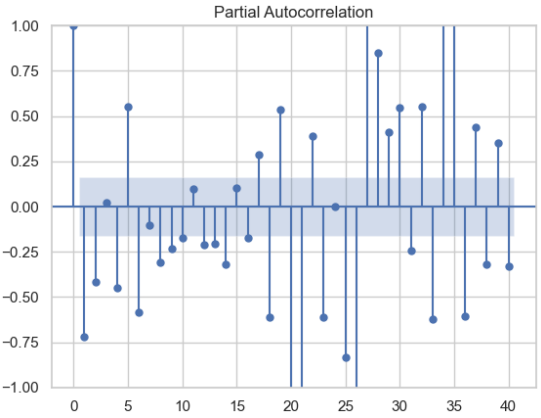
（A）



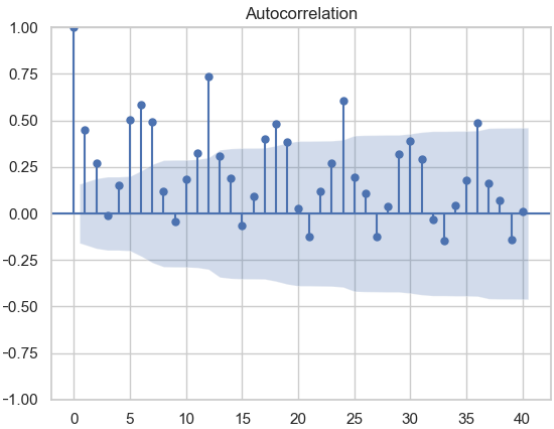


（B）

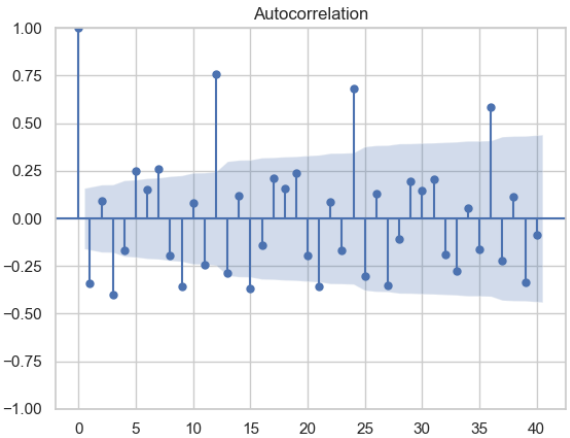


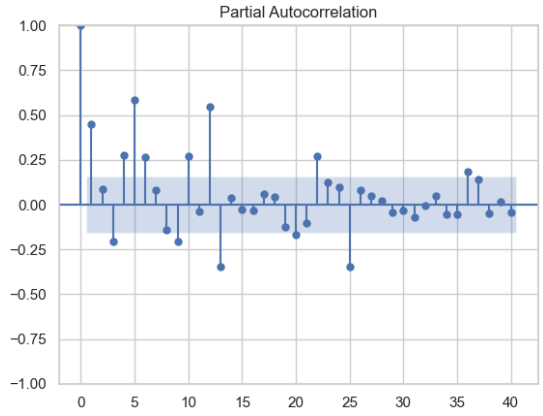


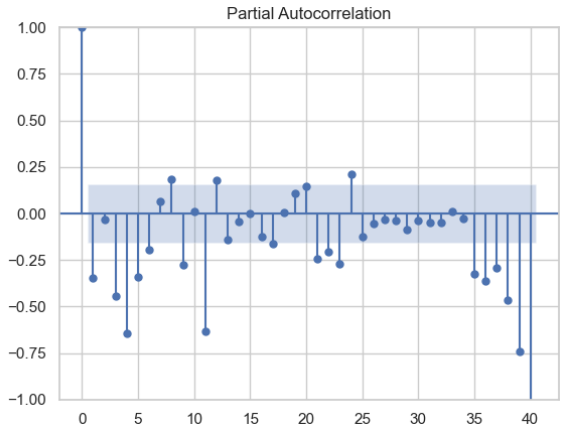
(C)



(D)







- (A)
- (B)
- (C)
- (D)

Question 2 (2 points) ✔ *Saved*

Suppose you notice a seasonal spike every 12 months. Employ seasonal differencing and estimate the time series model of C(t) with ARIMA (1,0,1) x (0,1,0)_12. Use sm.tsa.statespace.SARIMAX with a constant. What are the estimates of the intercept, the AR coefficient and the MA coefficient? Select the closest numbers.

- A) 253, 0.65, 0.21
- B) 943, 0.33, -0.18
- C) 95, 0.82, 0.16
- D) 114, 0.57, -0.24

Question 3 (2 points) ✔ *Saved*

What is the Jarque-Bera test statistic of the fitted residuals? Can you reject normal distribution at the one-tailed 1% significance level?

A) 9.85, Yes

B) 9.36, Yes

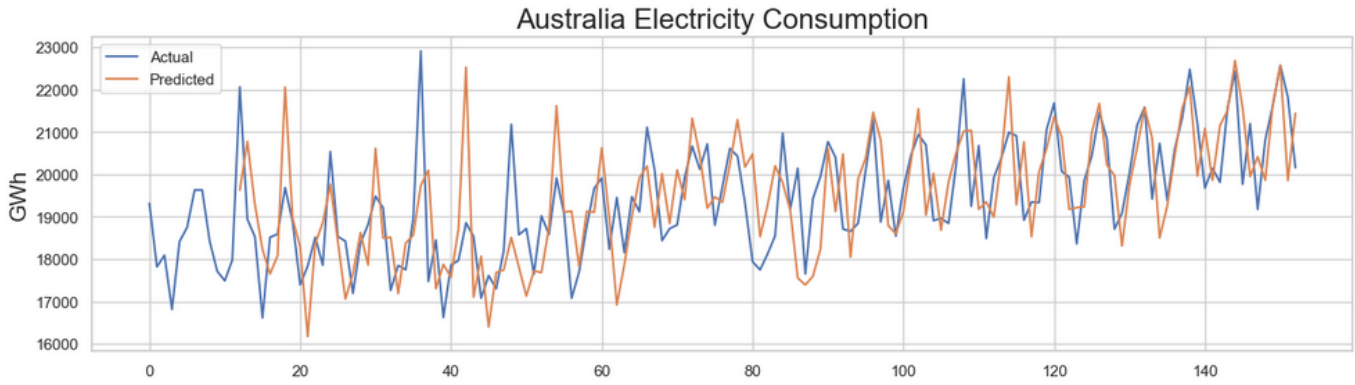
C) 7.62, No

D) 5.64, No

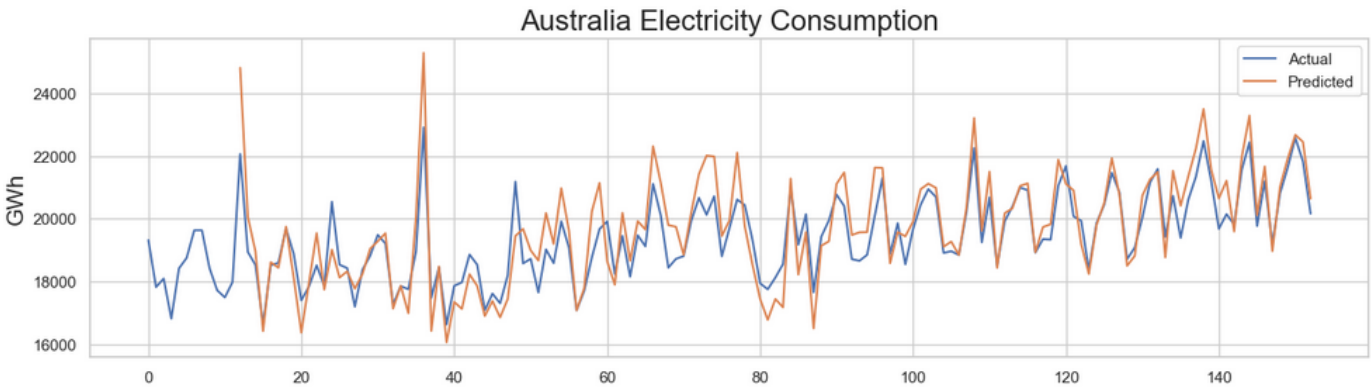
Question 4 (2 points) ✔ *Saved*

Construct a prediction of C(t) using model.fit().predict() and plot the actual versus the predicted C(t) for every month starting from Feb 2011 till Sep 2022. Indicate which of (A), (B), (C), (D) is the correct plot?

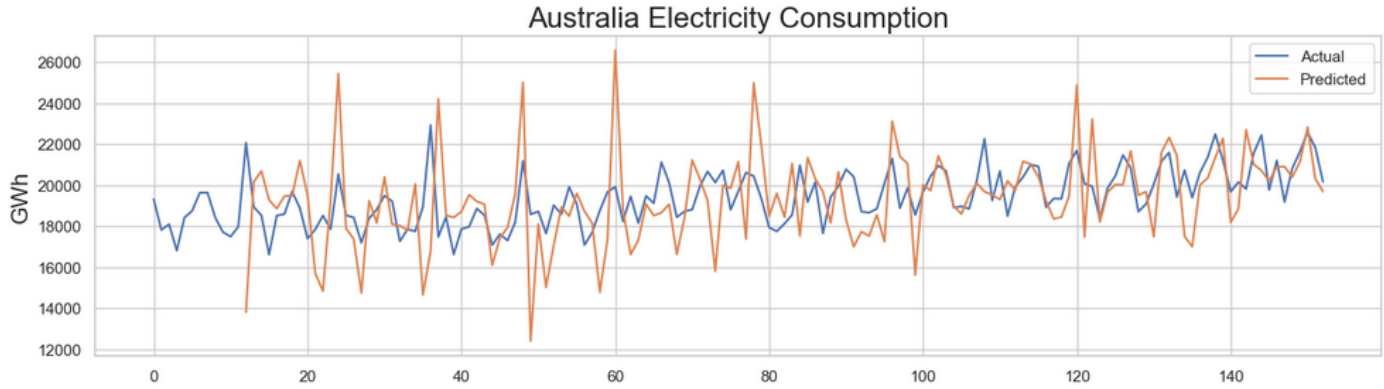
(A)



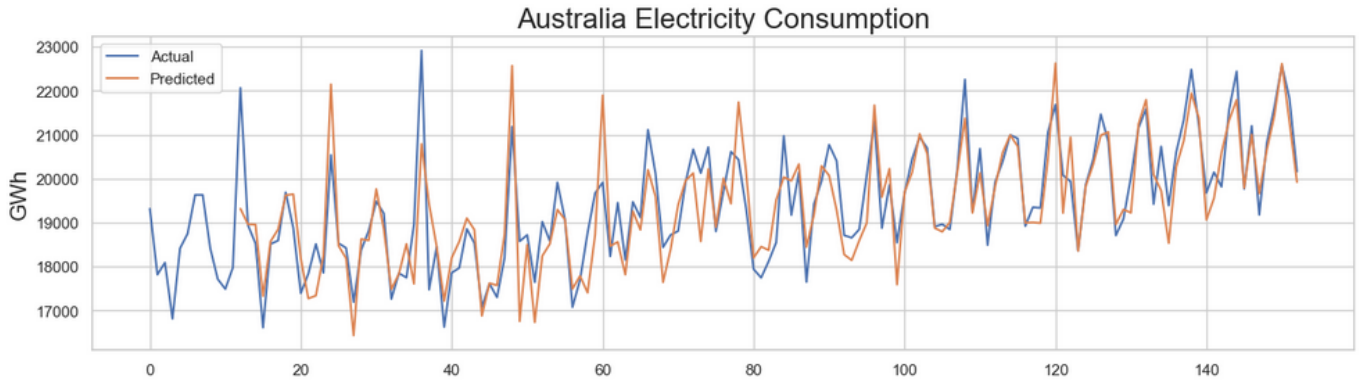
(B)



(C)



(D)



- (A)
- (B)
- (C)
- (D)

Question 5 (2 points) ✔ *Saved*

What are the minimum and maximum percentage error in the prediction in Question 4? (Note percentage error can be positive or negative depending on whether the predicted value is larger or smaller than the actual.)

- A) -5.7%, 6.1%
- B) -8.5%, 9.2%
- C) -11.3%, 11.8%
- D) -12.6%, 13.1%