Homework 4 Answer

1. (a) True

(b) False: over-differencing might cause overfitting (number of parameters in AR increases)

(c) True

(d) True (when damped = False)

(e) True.

2. $(1-\phi B)(1-B)Y_t = (1+\theta B)Z_t$

$(1-(\phi+1)B+\phi B^2)Y_t = (1+\theta B)Z_t$

AR(2) MA(1)

ARIMA(1,1,1) $\Leftrightarrow$ ARMA(2,1)

3. (a) (i) See python. ARIMA(0,1,0)

(ii) See python. ARIMA(1,1,1)

(iii) My choice ARIMA(0,2,1)

(iv) RMSE prefers ARIMA(0,1,0)

(v) MAPE prefers ARIMA(0,1,0)

(b) see python

(c) Based on the limitation of ARIMA, it's hard to find the "perfect" orders. Might consider using other model approached

4. (a) see python

(b) No obvious trend from plots, seasonality = 7

(c) my model 1 SARIMA ~~(4,0,3)(0,1,3)~~ (1,0,2)(0,1,3,7)

(d) my model 2 SARIMA (1,2,2)(1,1,3,7)
↑ d=2, 2 closer

(e). see python, I pick model 1.

(f) see python. mape = 13.27.