

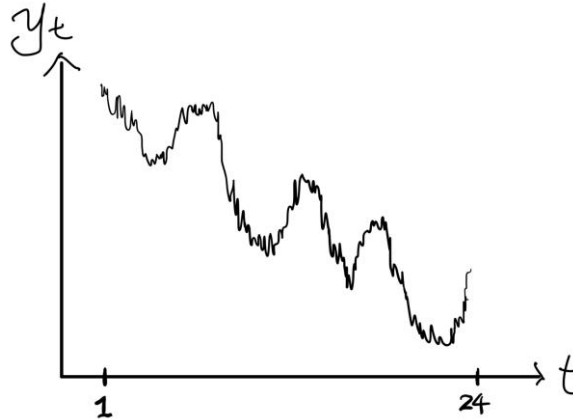


Time Series Analytics

109-1 Homework #02

Due at 23h59, September 27 2020; files uploaded to NTU-COOL

1. (30%) Take what you have simulated for the Q1 of HW#01 and add a proper disturbance to it, for example, $\epsilon_t \sim N(0, 0.1^2)$, to make it more fluctuating (and unpredictable). Now, construct a stochastic model to predict it.



- a. Explain how you design the disturbance.
 - b. Identify the number of periods in a season and then deseasonalize the series.
 - c. Calculate the seasonality factors (depending on how many periods in a season).
 - d. Finalize the model and evaluate the performance via MSE and MAPE.
 - e. Use the static model to predict $y_t, t = 25, \dots, 30$. Use the “true” model to simulate y_{25}, \dots, y_{30} and calculate the MSE and MAPE accordingly.
 - f. Modify the disturbance in (a) to change series (can be more or less fluctuating). Re-run the questions (b)-(d). What can you conclude when comparing to the results in (d) with the previous disturbance.
2. (20%) Construct the Holt-Winter’s model (Triple Exponential Smoothing model) for the same data in 1-(a). Try to find the smoothing factors with better performance. Explain what you observe comparing with the results in 1-(d).