

# Social Forecasting — Assignment 2

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Due date: Week 5

When submitting your answers, please 1) show your code and 2) make sure your presentation is clear and easy to follow. Rmarkdown will make it easy to produce a suitable report, but you are welcome to use another approach if you prefer.

1. Import in R the dataset named ‘usmelec.csv’. The data include information on monthly total net generation in the USA (1973–2013) measured in billions of kilowatt hours (kWh).
2. Decompose the data into three components: the seasonal component; the trend; and the remainder. Display the main time series and its individual components in a plot.
3. Plot the data again, but this time add a simple exponential smoothing curve to it and the associated predictions 12 periods ahead. Tip: use  $\alpha = 0.05$  for a smoother curve.
4. Do you think there is an issue of autocorrelation with the data? How would you know and how should you address it? Should you be concerned about anything else?
5. Fit an arima model to the data and report the results of the model (i.e., print the R output). You may either choose your own ARIMA parameters, or use the `auto.arima` function in R. Express the model (either yours or the one chosen by `auto.arima`) in equation form.
6. Using a plot, report the residuals of your ARIMA model and comment on whether they are satisfactory.