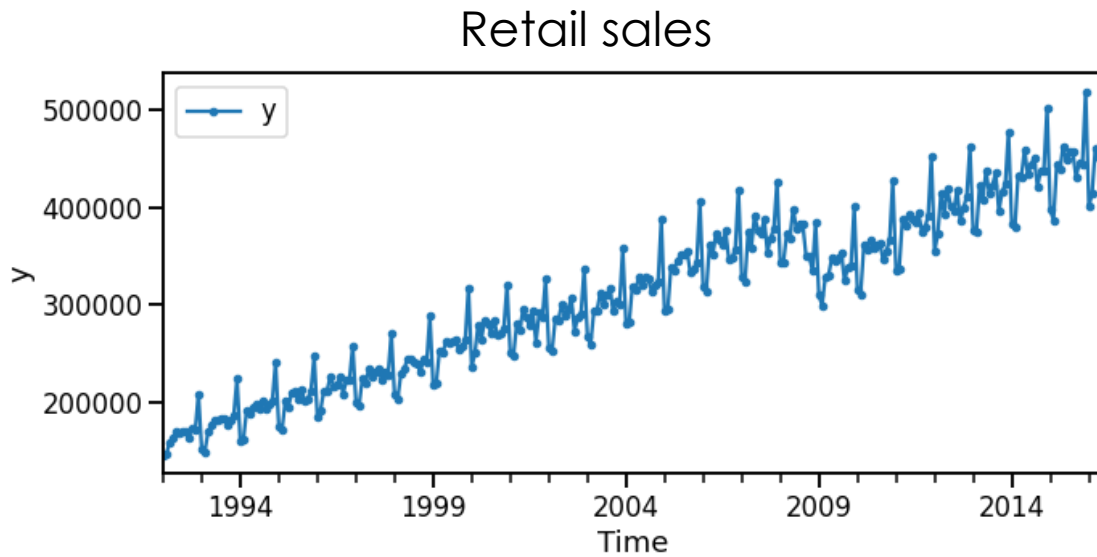


Summary of seasonality features

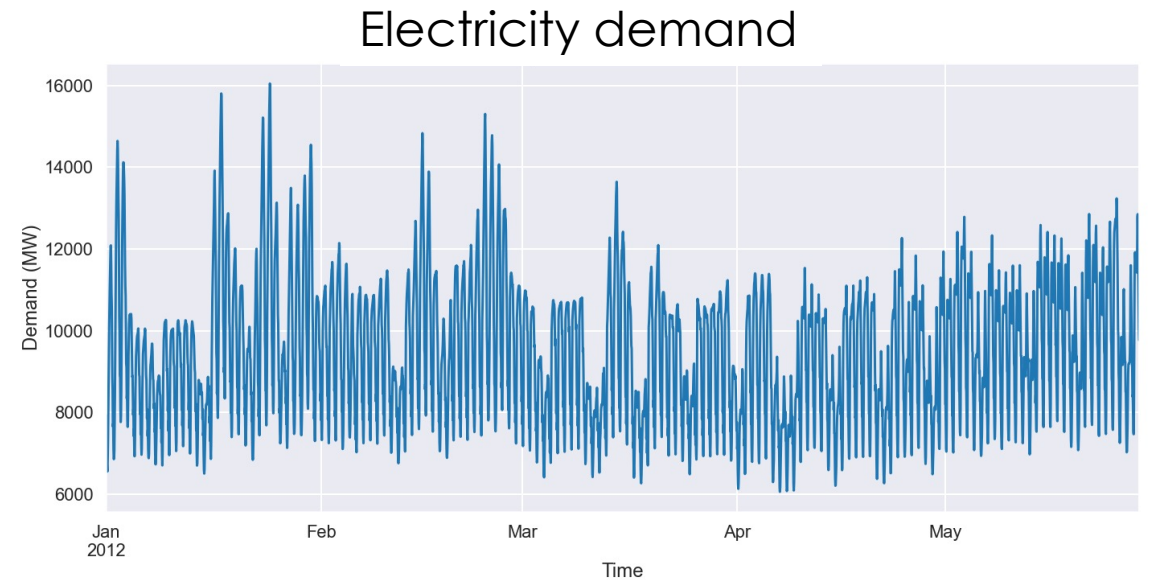
Seasonality
features

What is seasonality?

A pattern or effect that repeats with **a fixed frequency** over time. Typically related to the calendar or time of day.



Yearly seasonality



Daily, weekly, and yearly seasonality

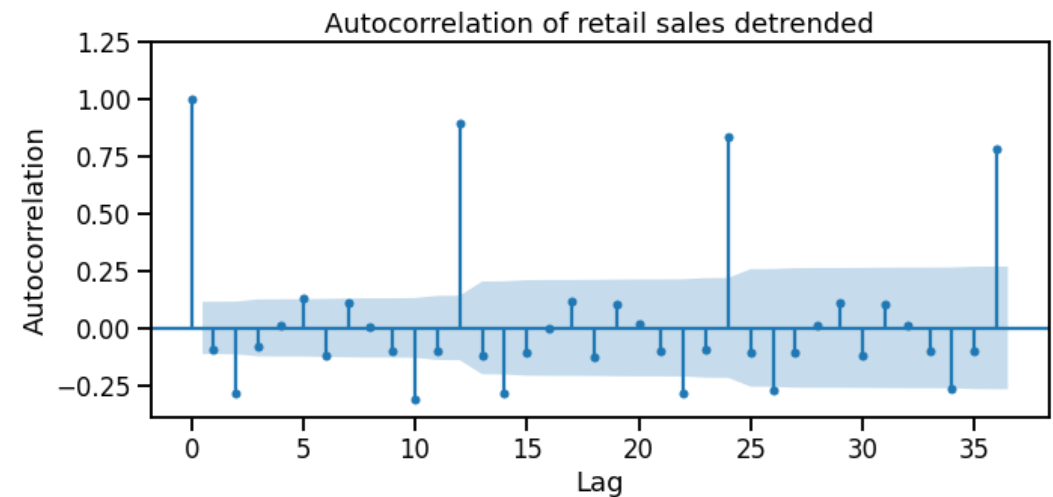
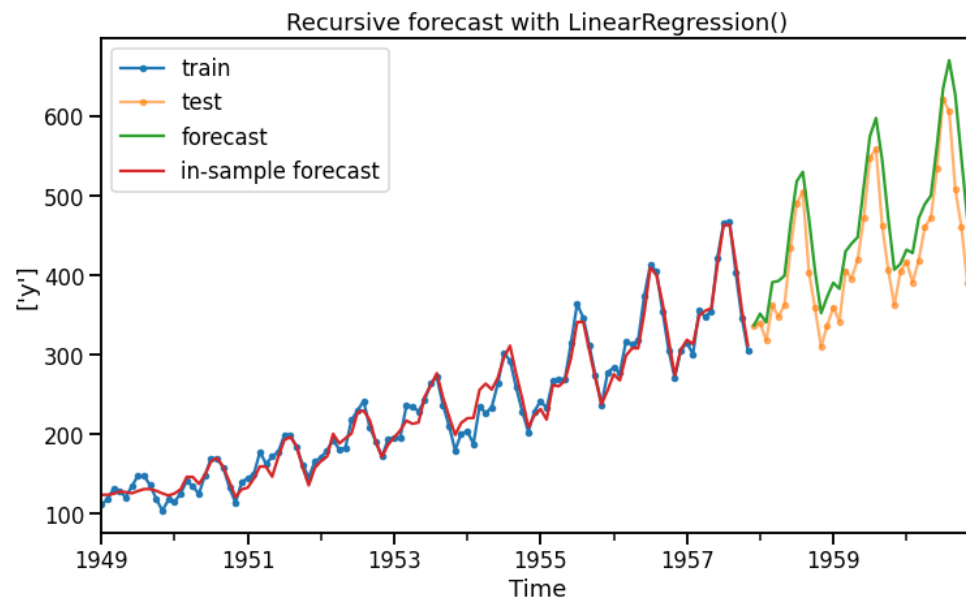
Features to capture seasonality

1. Lag features
2. Calendar features (aka datetime features)
3. Seasonal dummies (aka seasonal indicators)
4. Fourier features

Features to capture seasonality

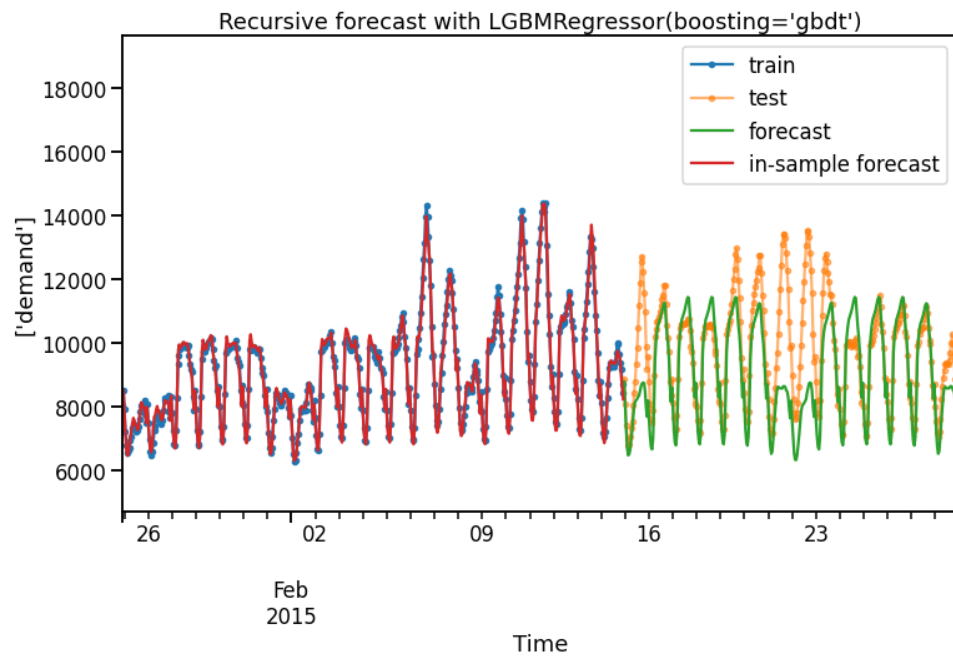
1. **Lag features**
2. Calendar features (aka datetime features)
3. Seasonal dummies (aka seasonal indicators)
4. Fourier features

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-12}$$



Features to capture seasonality

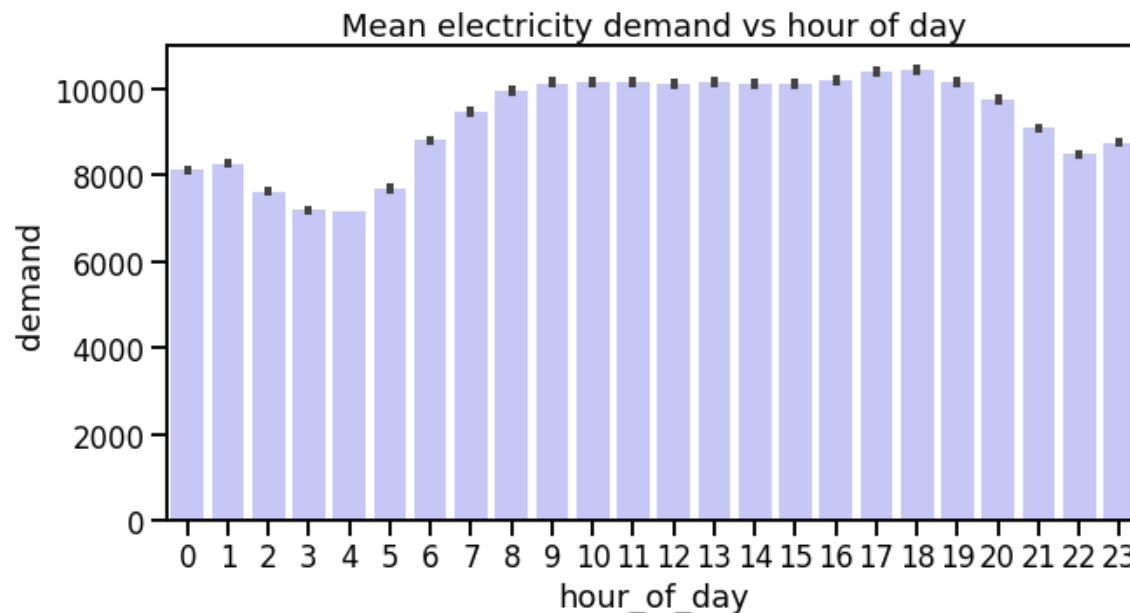
1. Lag features
2. **Calendar features (aka datetime features)**
3. Seasonal dummies (aka seasonal indicators)
4. Fourier features



Date	Sales	Month	Day of week
2020-02-12	23	2	2
2020-02-13	30	2	3
2020-02-14	35	2	4
2020-02-15	30	2	5
2020-02-16	?	2	6

Features to capture seasonality

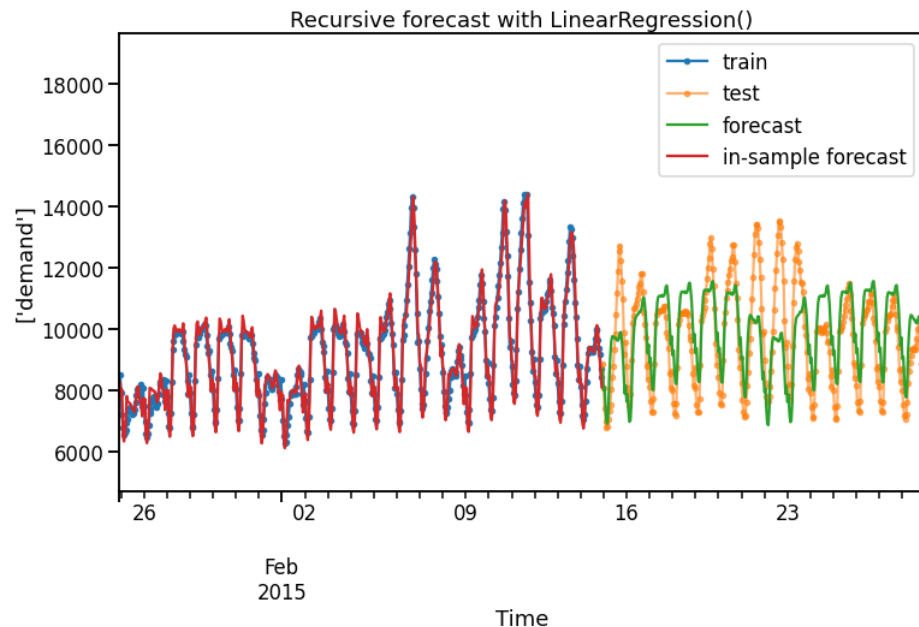
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Features to capture seasonality

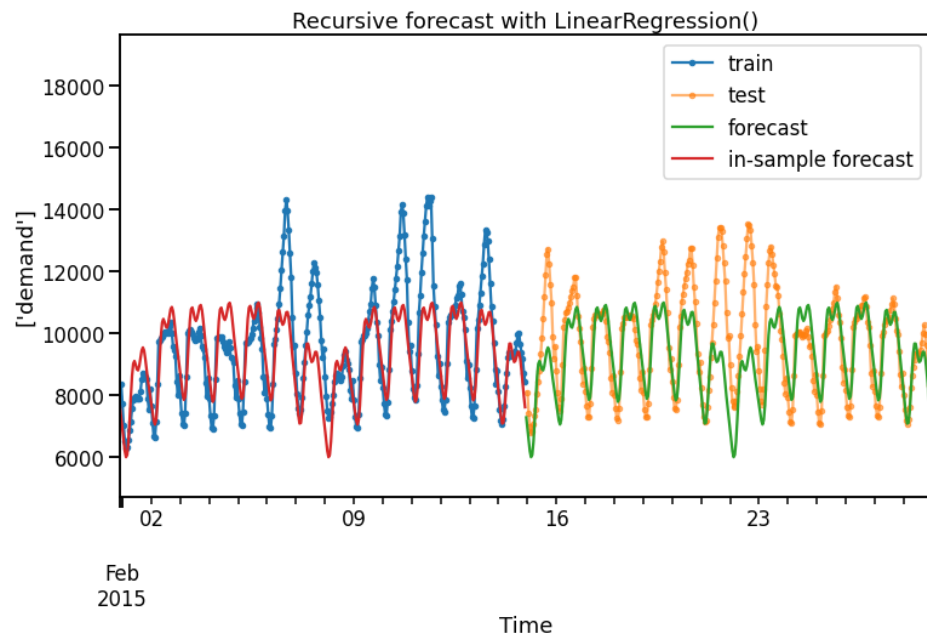
1. Lag features
2. Calendar features (aka datetime features)
- 3. Seasonal dummies (aka seasonal indicators)**
4. Fourier features



Date	Sales	Is_Jan	Is_Feb	Is_Mar	...
2020-02-12	23	0	1	0	
2020-02-13	30	0	1	0	
2020-02-14	35	0	1	0	
2020-02-15	30	0	1	0	
2020-02-16	?	0	1	0	

Features to capture seasonality

1. Lag features
2. Calendar features (aka datetime features)
3. Seasonal dummies (aka seasonal indicators)
- 4. Fourier features**



$$s(t) = s(t + T)$$



$$A_1 \sin(2\pi * f * t)$$



$$A_2 \sin(2\pi * 2f * t)$$



$$A_3 \sin(2\pi * 3f * t)$$



$$A_4 \sin(2\pi * 4f * t)$$

