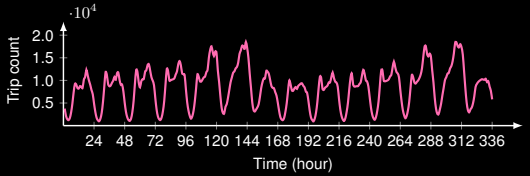
Essential Idea of Sparse Autoregression & Periodicity Quantification

① Hourly ridesharing trip time series

(336 data pints x_t)



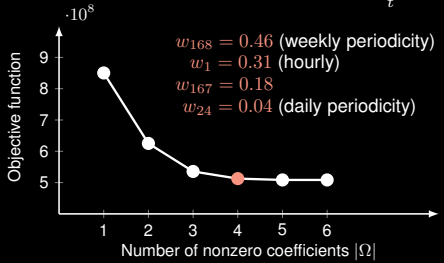
② Autoregression (order-168)

$$\min \sum_t \left(x_t - \sum_{k=1}^{168} w_k x_{t-k} \right)^2$$

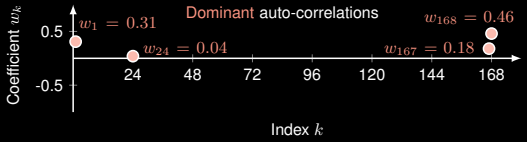
Dense

③ Sparse autoregression

$$\min \sum_t \left(x_t - \sum_{k \in \Omega} w_k x_{t-k} \right)^2 \quad \text{s.t.} \ \underbrace{|\Omega| \leq \tau}_{\text{sparsity}}$$



Sparse



Thanks for your attention!

Any Questions?

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