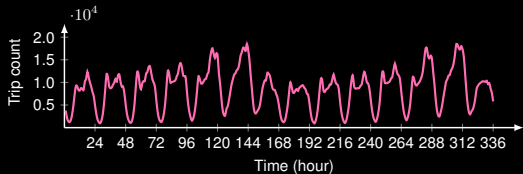


Essential Idea of Sparse Autoregression & Periodicity Quantification

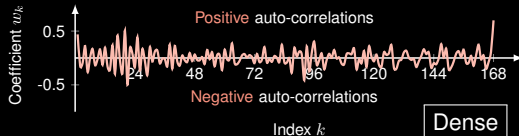
① Hourly ridesharing trip time series

(336 data points x_t)



② Autoregression (order 168)

$$\min_{w_1, \dots, w_{168}} \sum_t \left(x_t - \sum_{k=1}^{168} w_k x_{t-k} \right)^2$$



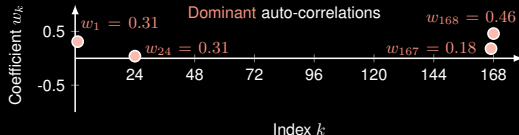
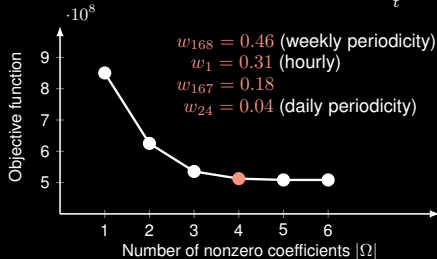
Dense



Sparse

③ Sparse autoregression

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



Thanks for your attention!

Any Questions?

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