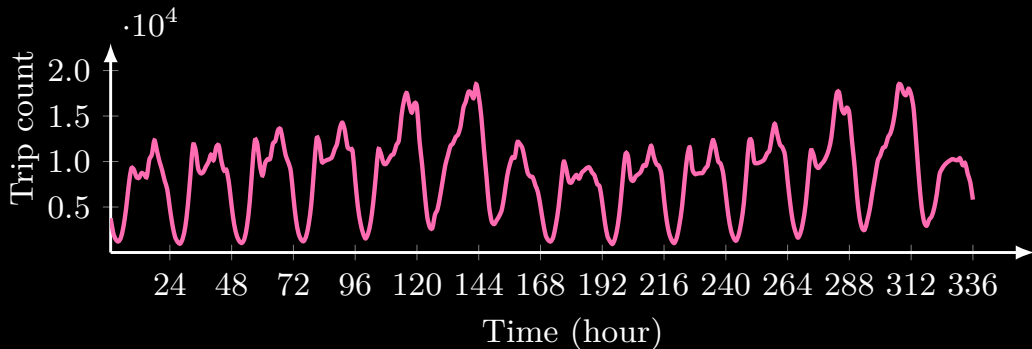
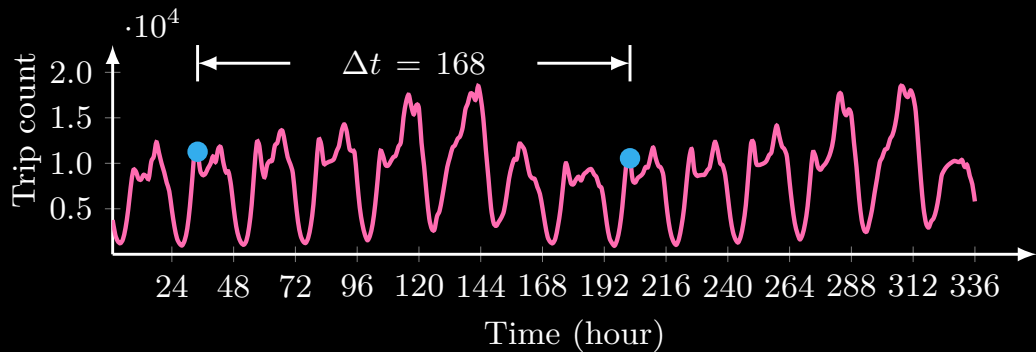


Essential Ideas of Sparse Autoregression

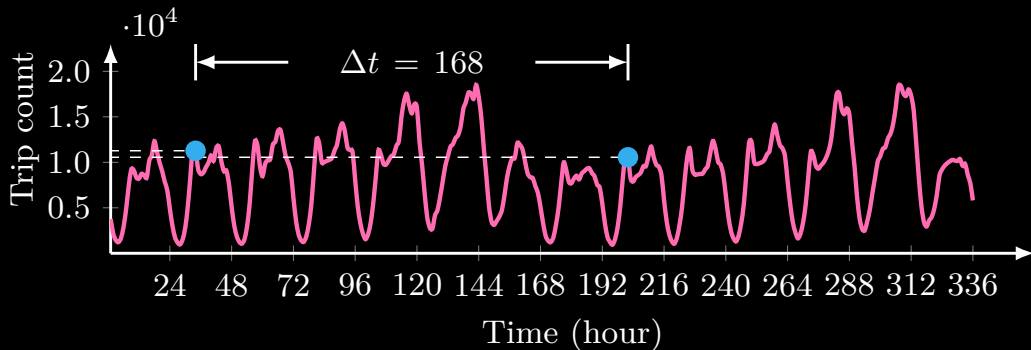
Annotating Ridesharing Trip Time Series

Chicago ridesharing trip time series x_t , $t = 1, \dots, 336$

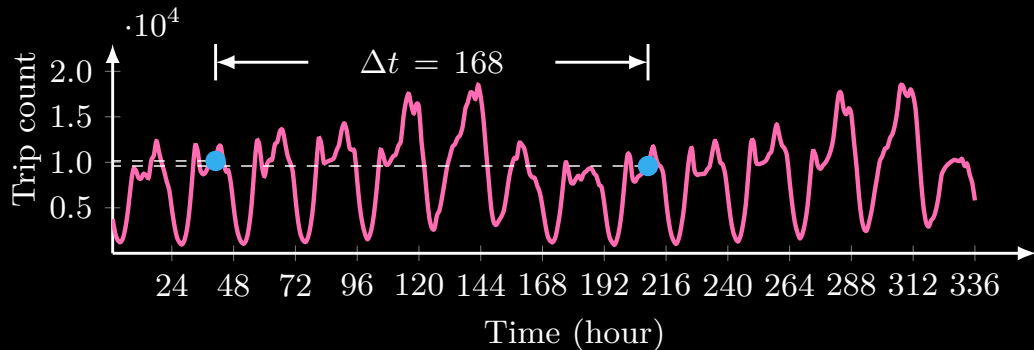




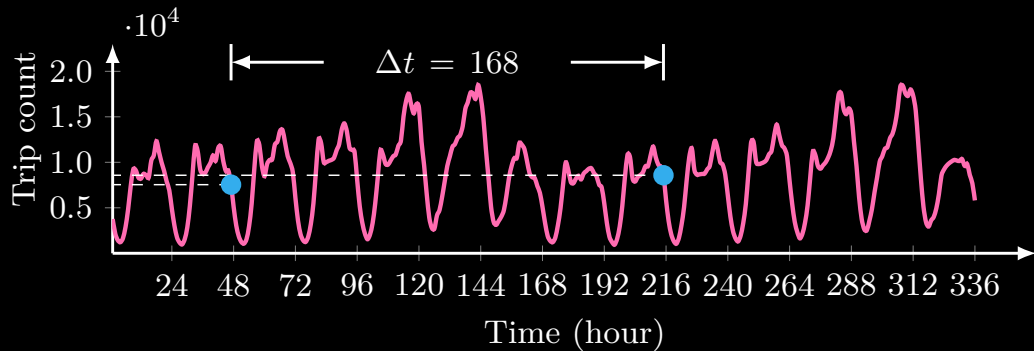
Weekly periodicity at $t_0 = 34$



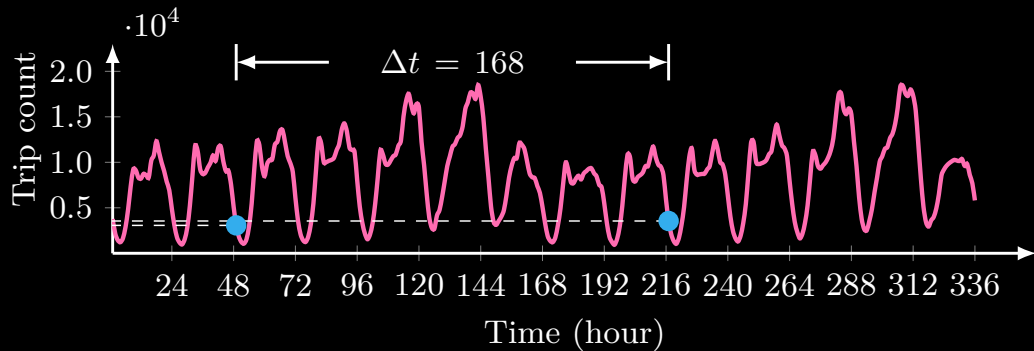
Weekly periodicity at $t_0 = 41$



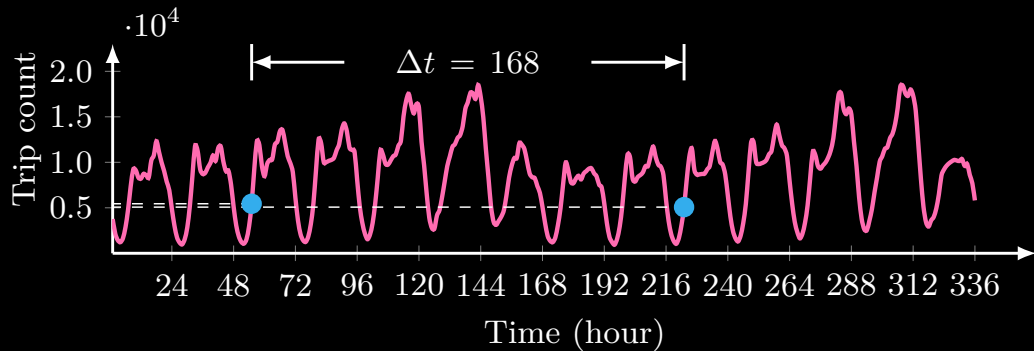
Weekly periodicity at $t_0 = 47$



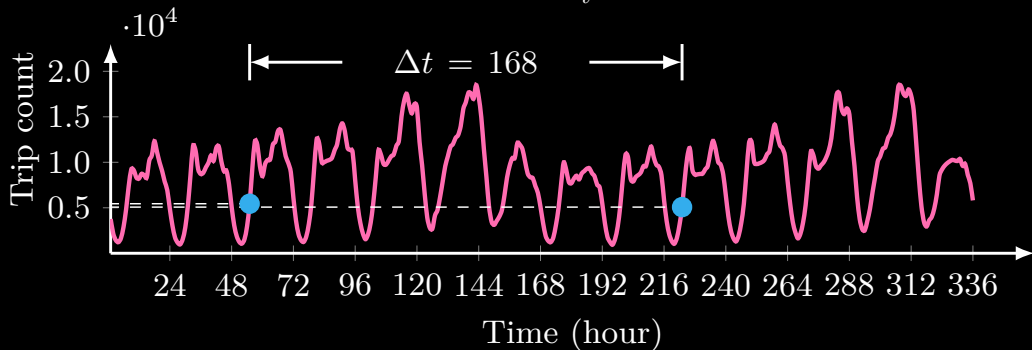
Weekly periodicity at $t_0 = 49$



Weekly periodicity at $t_0 = 55$



Auto-correlations. $\min_{w_{168}} \sum_t (x_t - w_{168} x_{t-168})^2$



Time Series Autoregression

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

Time Series Autoregression

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

Time Series Autoregression

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

$$\Delta t = 168$$

$$\Delta t = 24, 168$$

$$\Delta t = 1, 24, 168$$