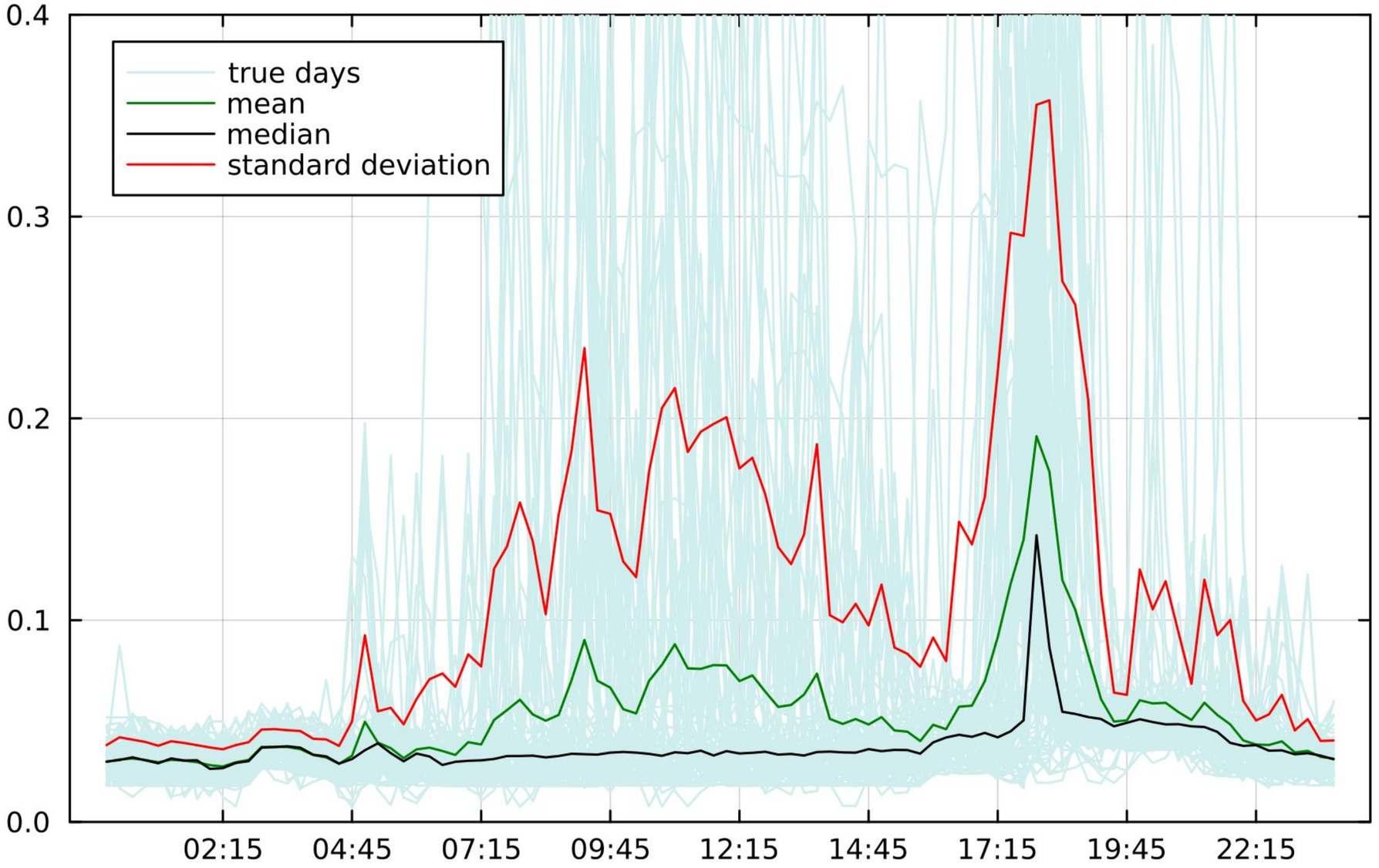
VALIDATION OF A HIDDEN MARKOV MODEL (HMM) BASED PROBABILISTIC FORECASTING METHOD ON HOUSEHOLD'S ELECTRIC POWER LOAD

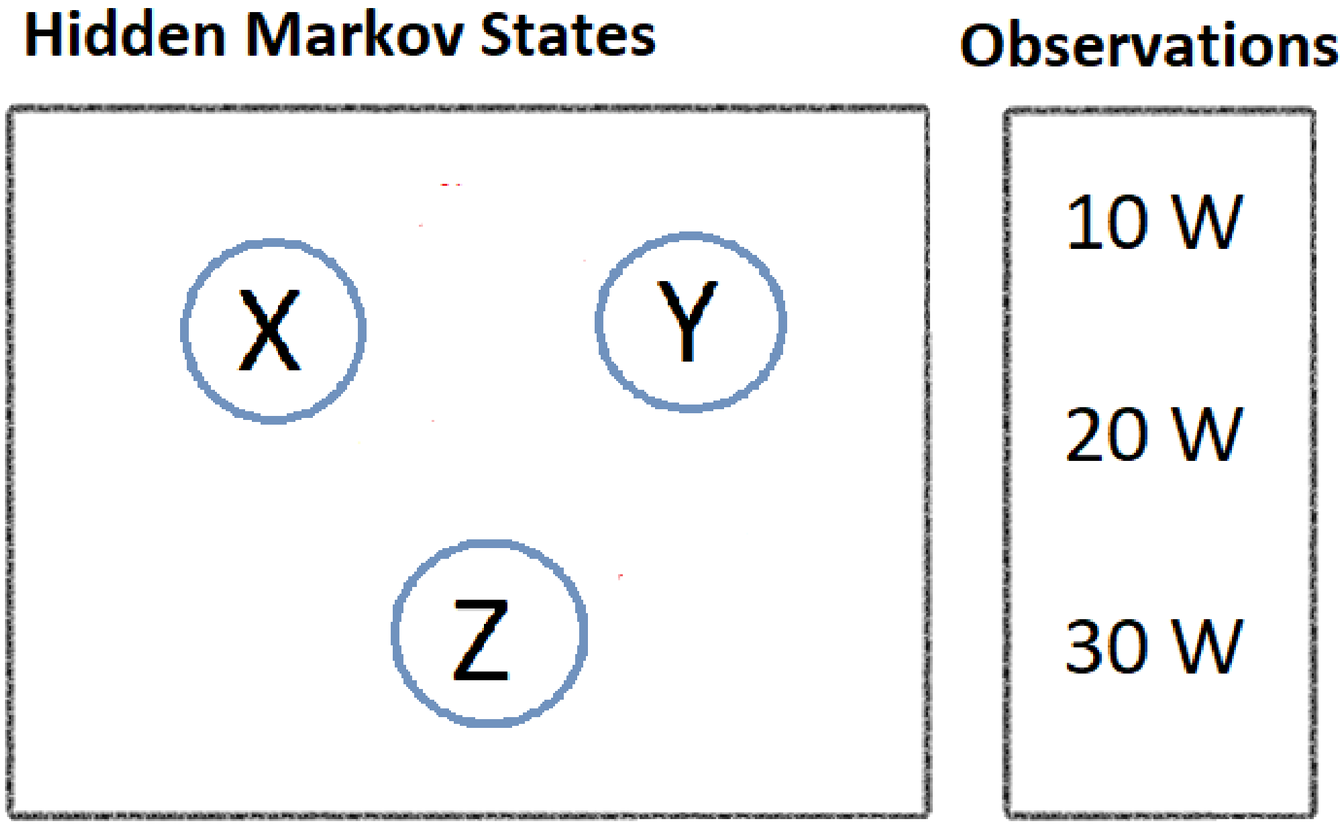
Florian Schimek

What is probabilistic forecasting?

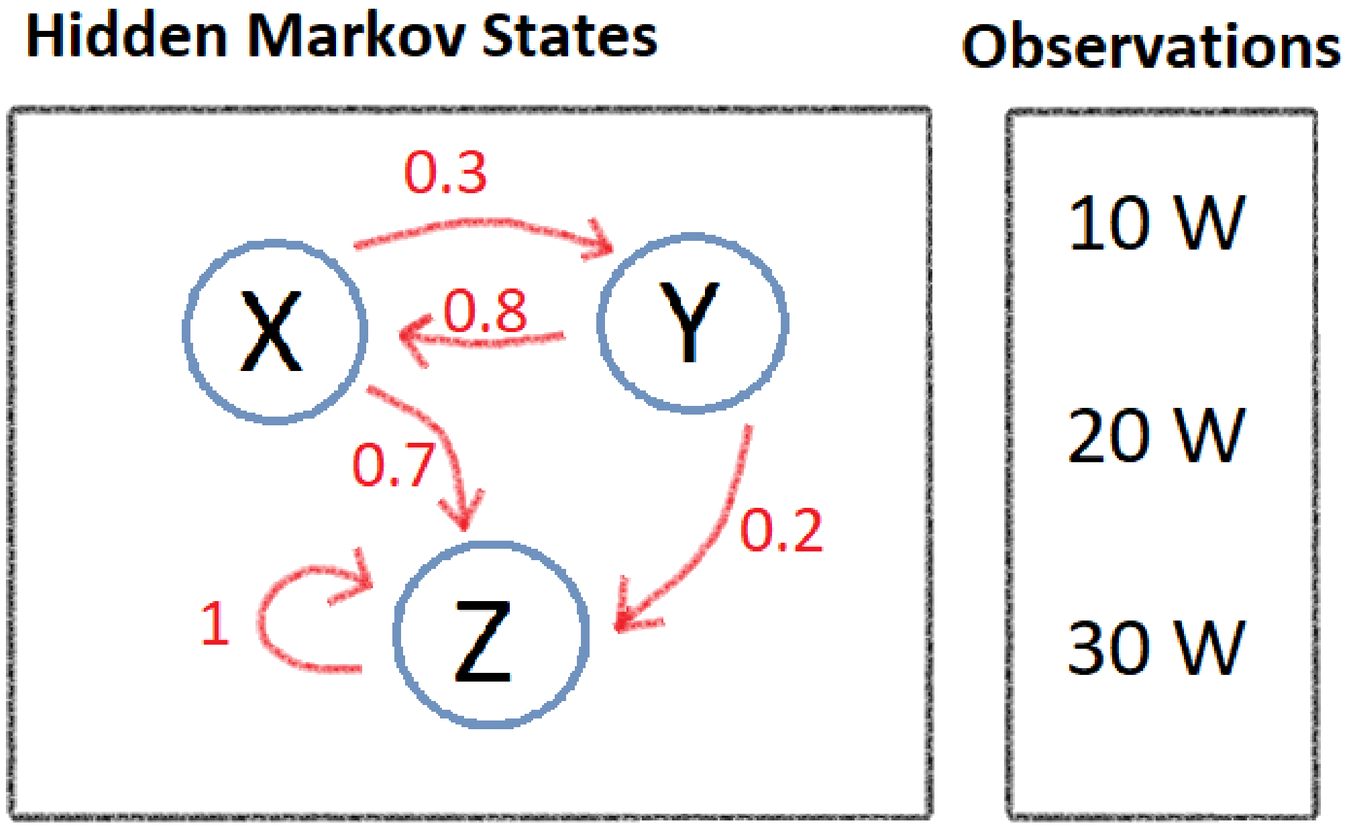
Daily Profiles of a Household



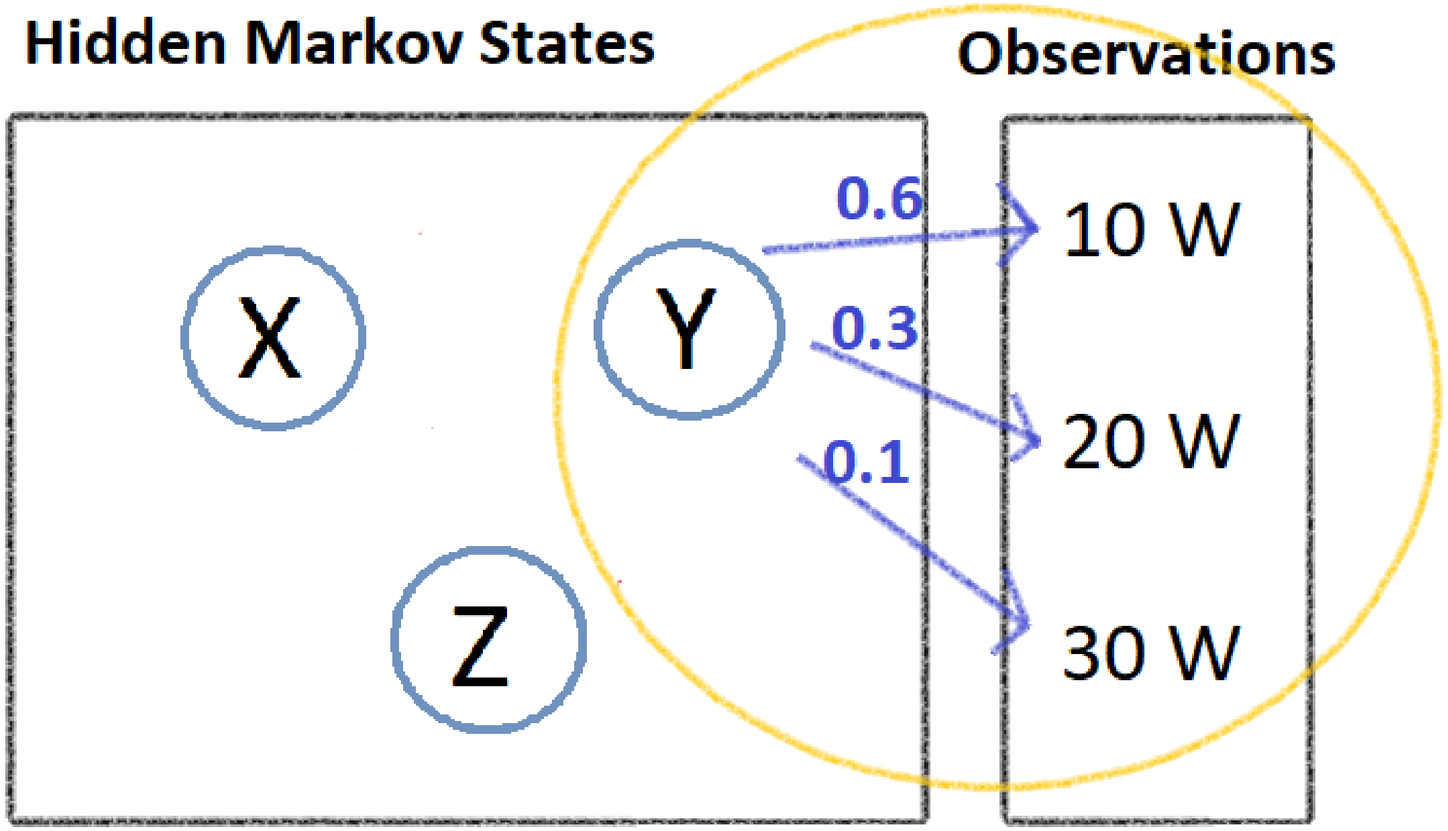
Hidden Markov Model



Hidden Markov Model



Hidden Markov Model



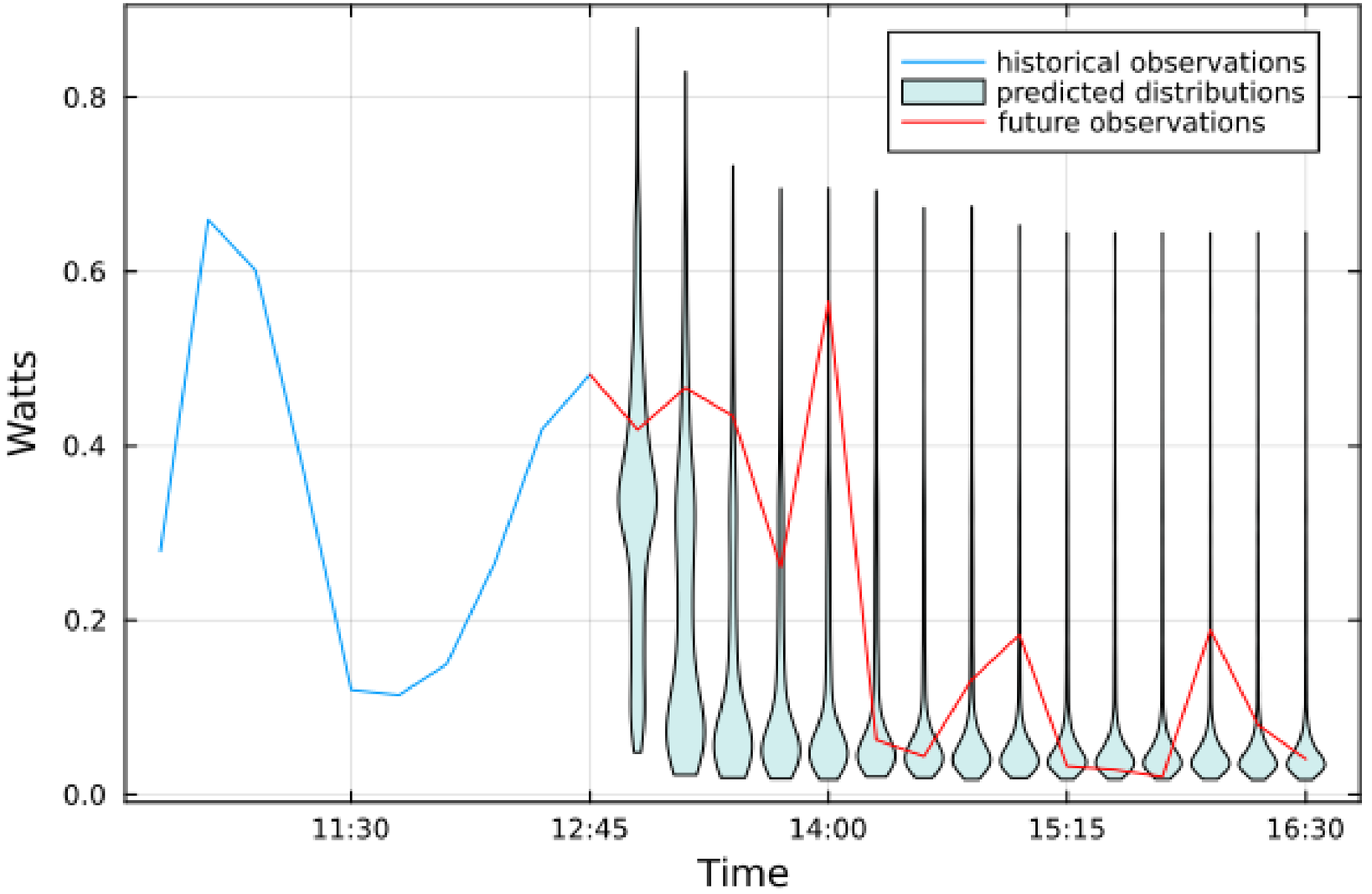
Hidden Markov Model

- Efficient
- Understandable (No Black-Box)
- In mathematical closed form

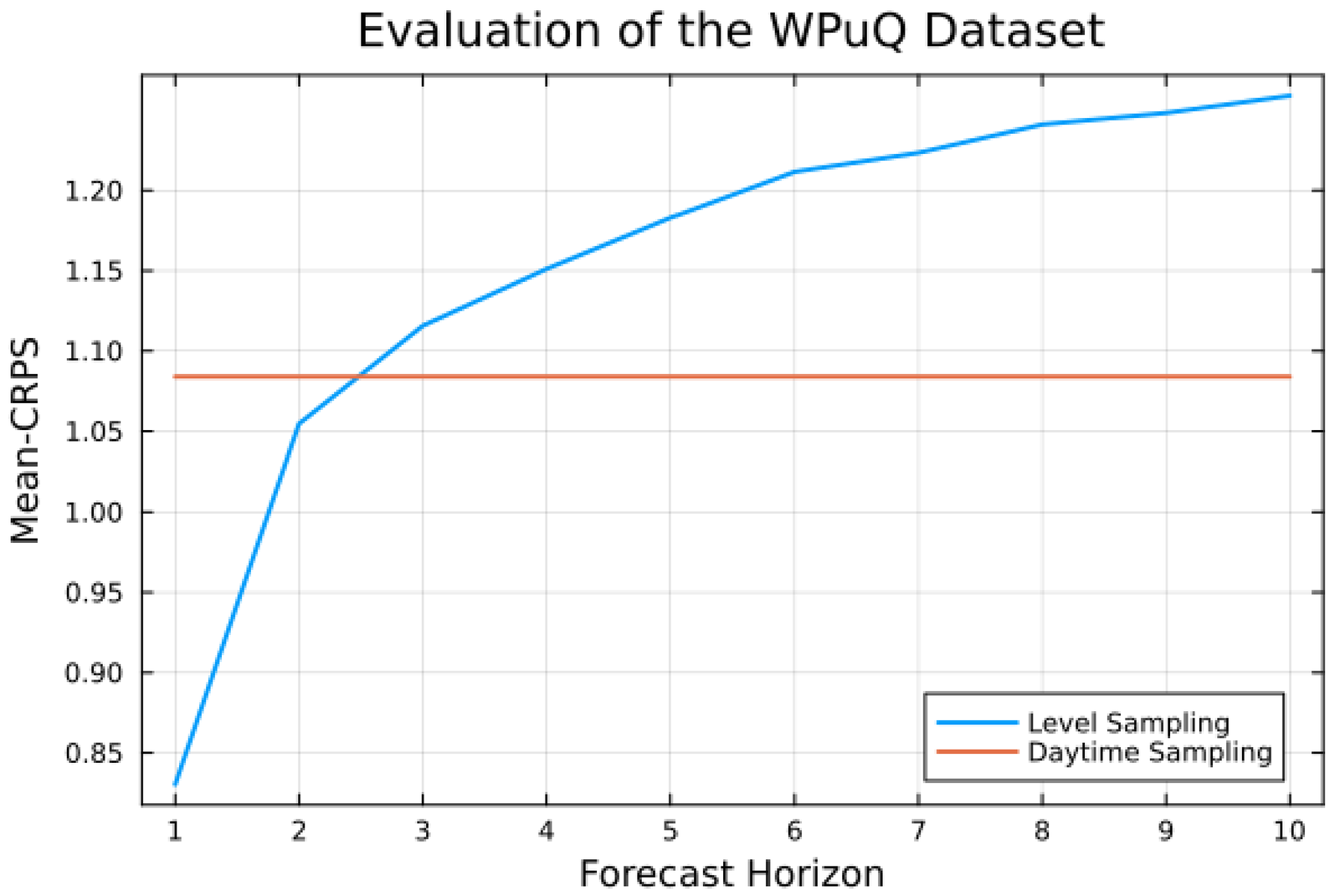
Methodology

- Goal:
  Predict the distribution of the electricity power demand of a household.
- Implementation Pipeline:
  Preprocessing $\rightarrow$ Training $\rightarrow$ Forecasting $\rightarrow$ Postprocessing
- WPuQ[4] Dataset:
  15 households; 2 years in 15min resolution; max-normed
- Evaluation: Continuous ranked probability score (CRPS)

Methodology



Preliminary Results



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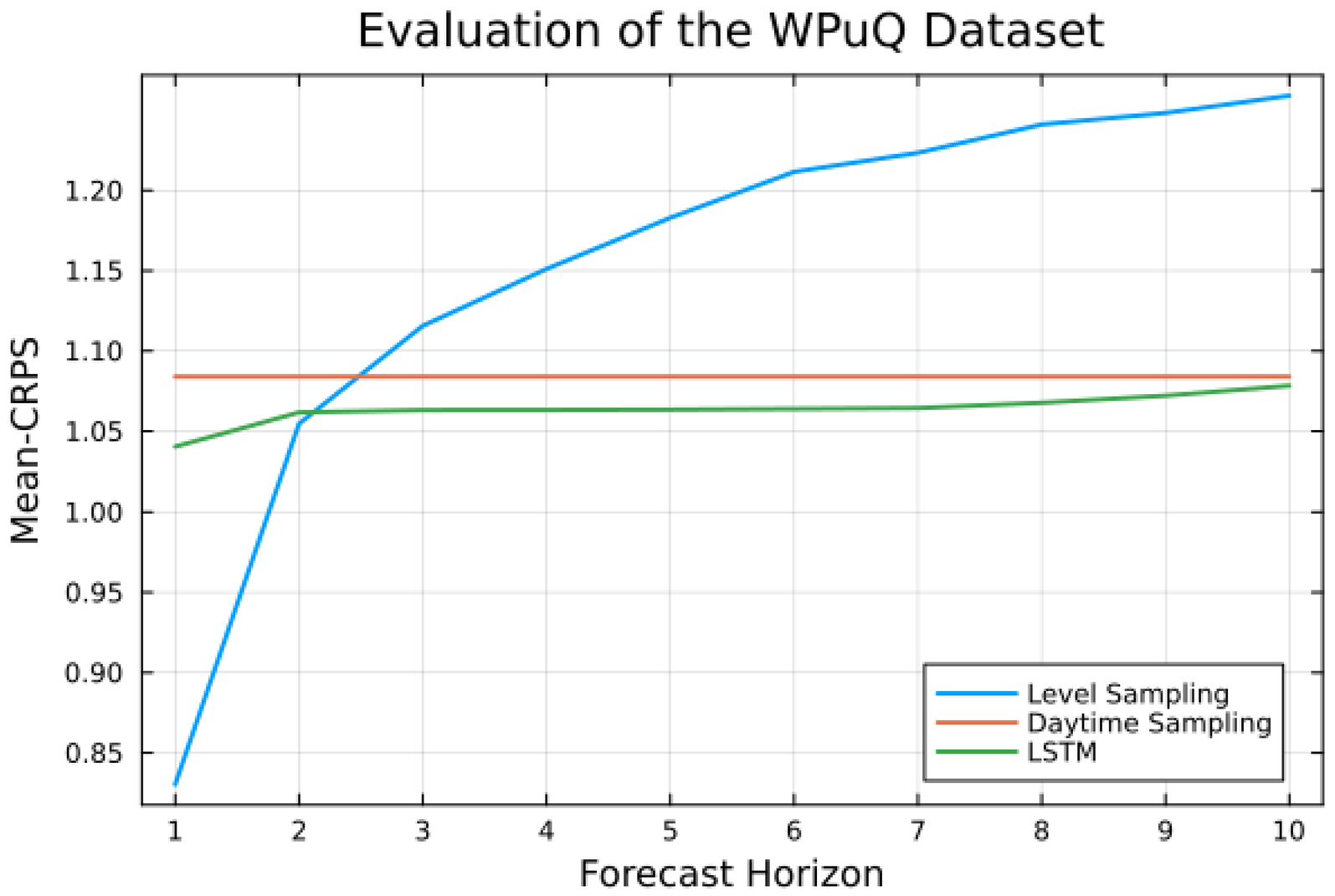

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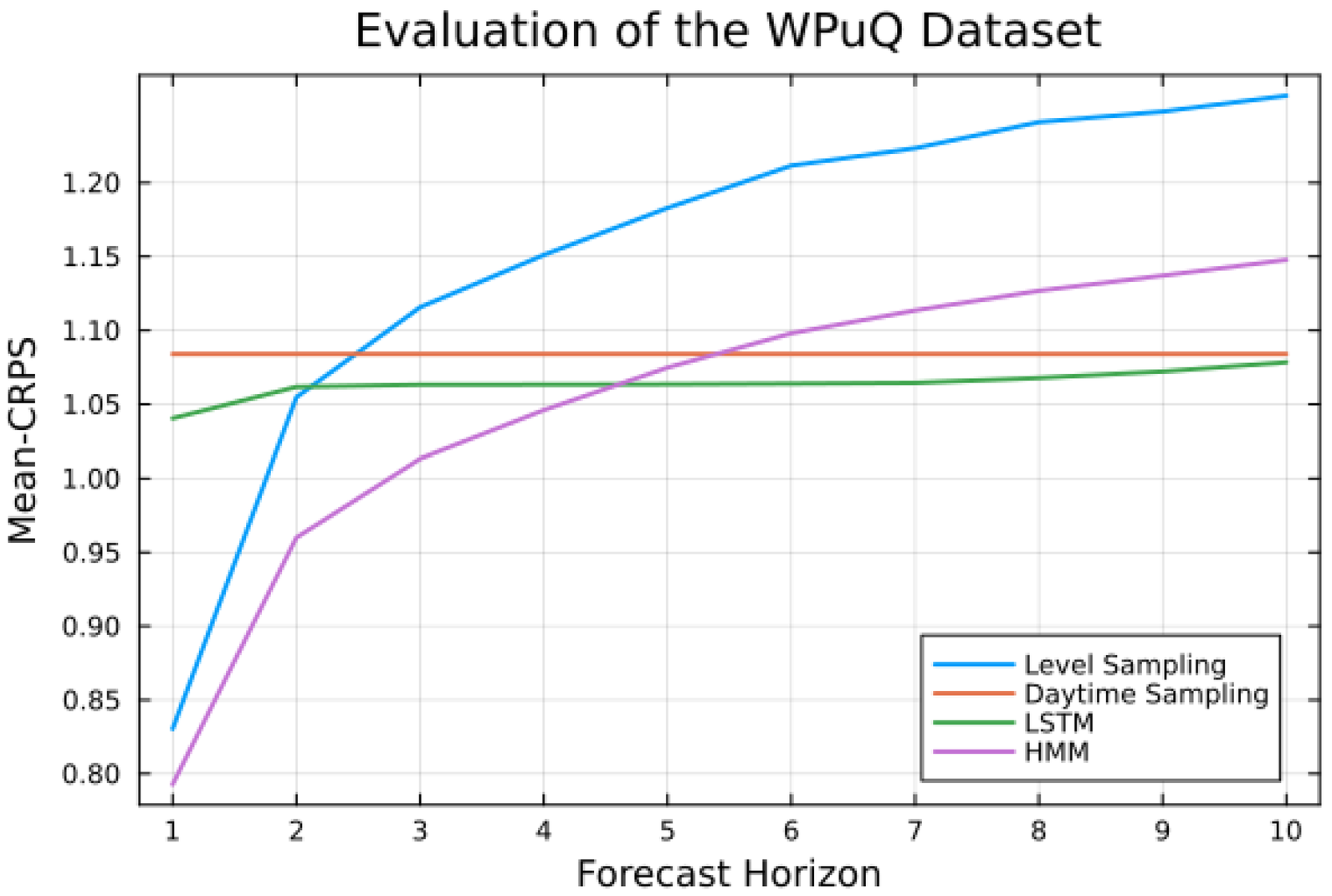

Thank you!

F. Schimek, “Probabilistic forecasting using Hidden Markov models: A use-case for household electrical power load forecasting” Diploma thesis, TU Wien, 2025

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