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Model-Based Run-Time and Memory Usage Optimization

for a mixed-used multi-energy system model with high spatial
resolution

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Motivation



Use Case

- optimization of **mixed-used multi-energy systems**
- urban districts with **~1000 buildings**

Investment Optimization

- approx. 10 investment decisions per building
- **mixed-integer** and **linear** investment decisions

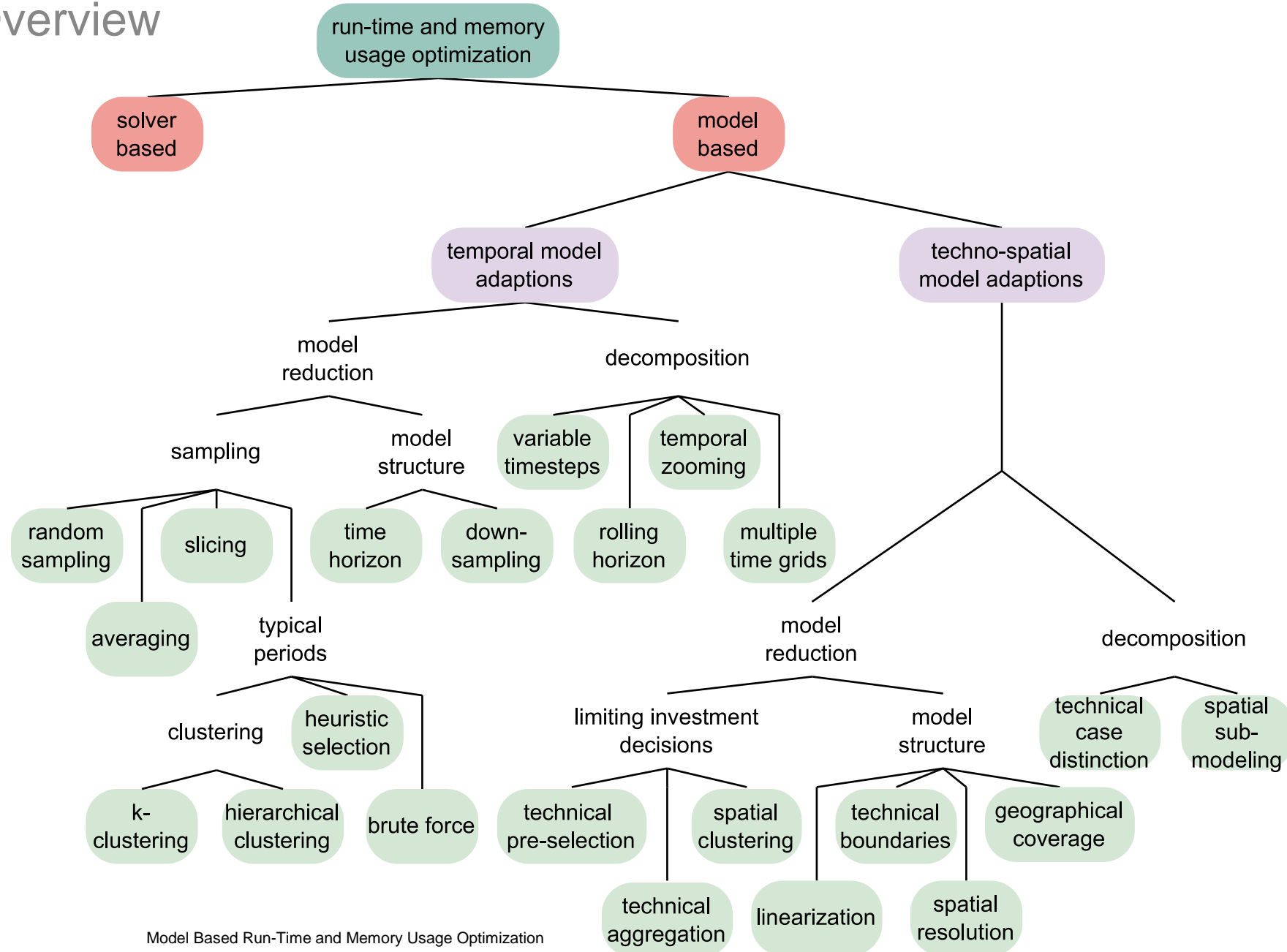
Computing Resources

- large models **exceed** the available resources of **run-time and memory usage**

Run-time and Memory Usage Optimization

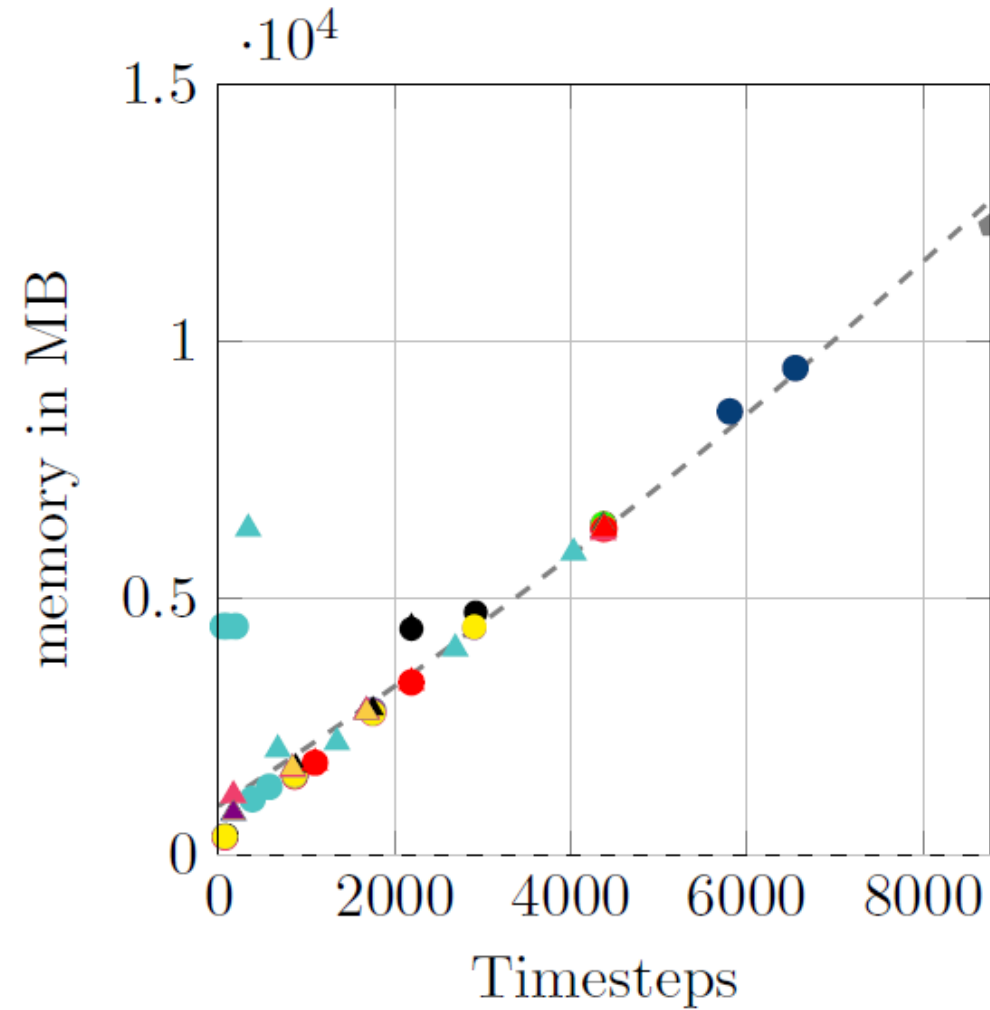
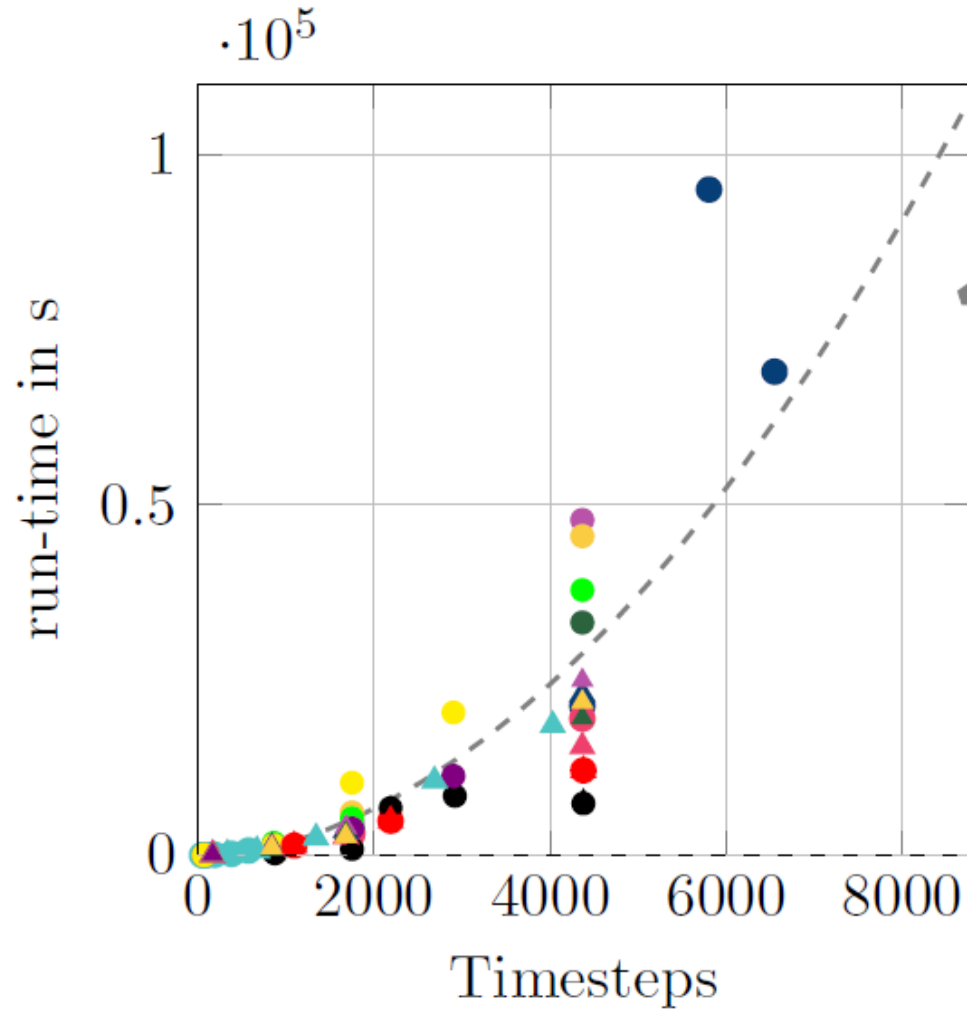


Methods Overview



Run-time and Memory Usage Optimization

Example: Improvements due to Temporal Simplifications



Test Case: Improvements

- **Within a test case, the run-time was reduced by 99 % and the memory requirement by 77 %**
- Applied methods: pre-modeling, technical pre-selection, technical boundaries, spatial sub-modeling, temporal slicing (every 2nd day)
- Slight miscalculation for only a few investment decisions (heat pumps and battery storages)



Thank you!



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