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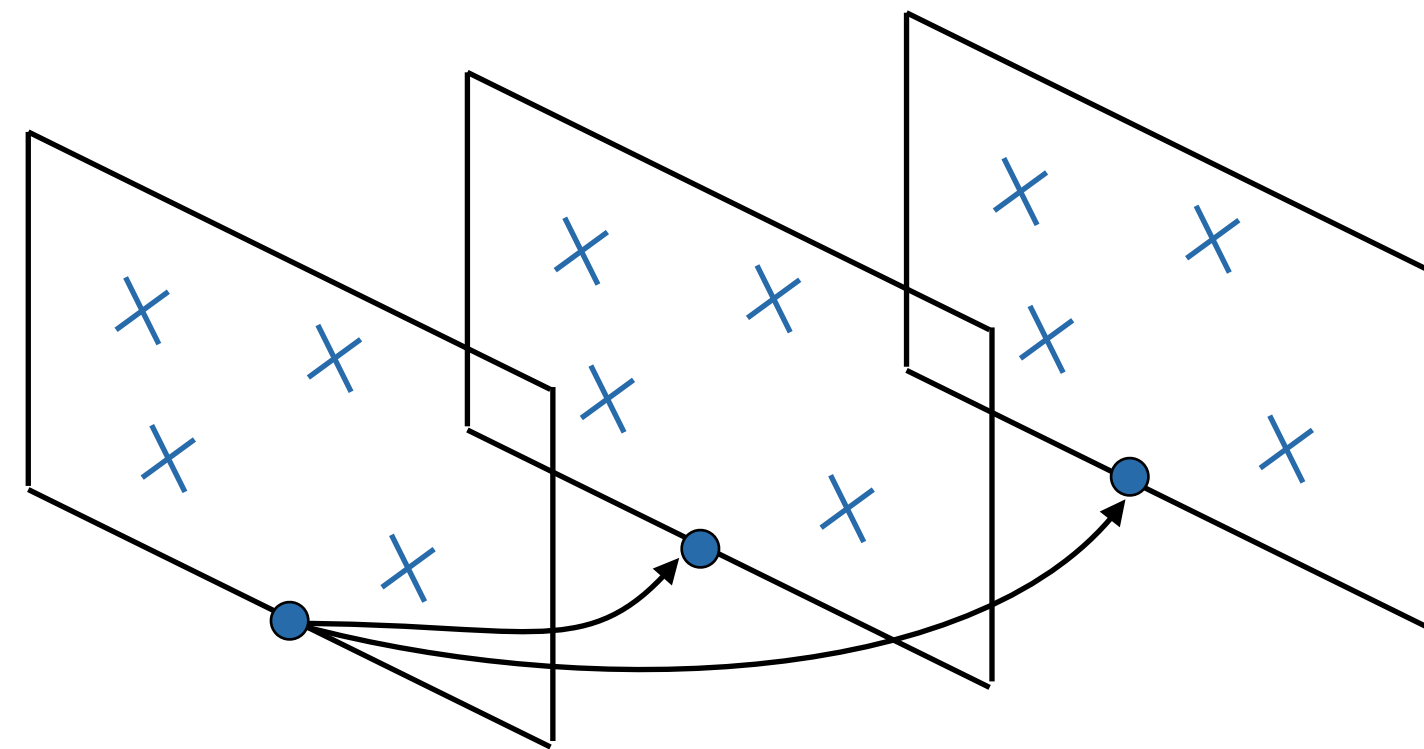
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Motion-without-Structure: Real-time Multipose Optimization for Accurate Visual Odometry

Motivation

Bundle Adjustment considers all measurements of a time frame jointly and estimates the entire scene.

- Hence exhibiting a **large computational complexity**.



Pose Adjustment considers all displacements of a time frame jointly and does not estimate the scene.

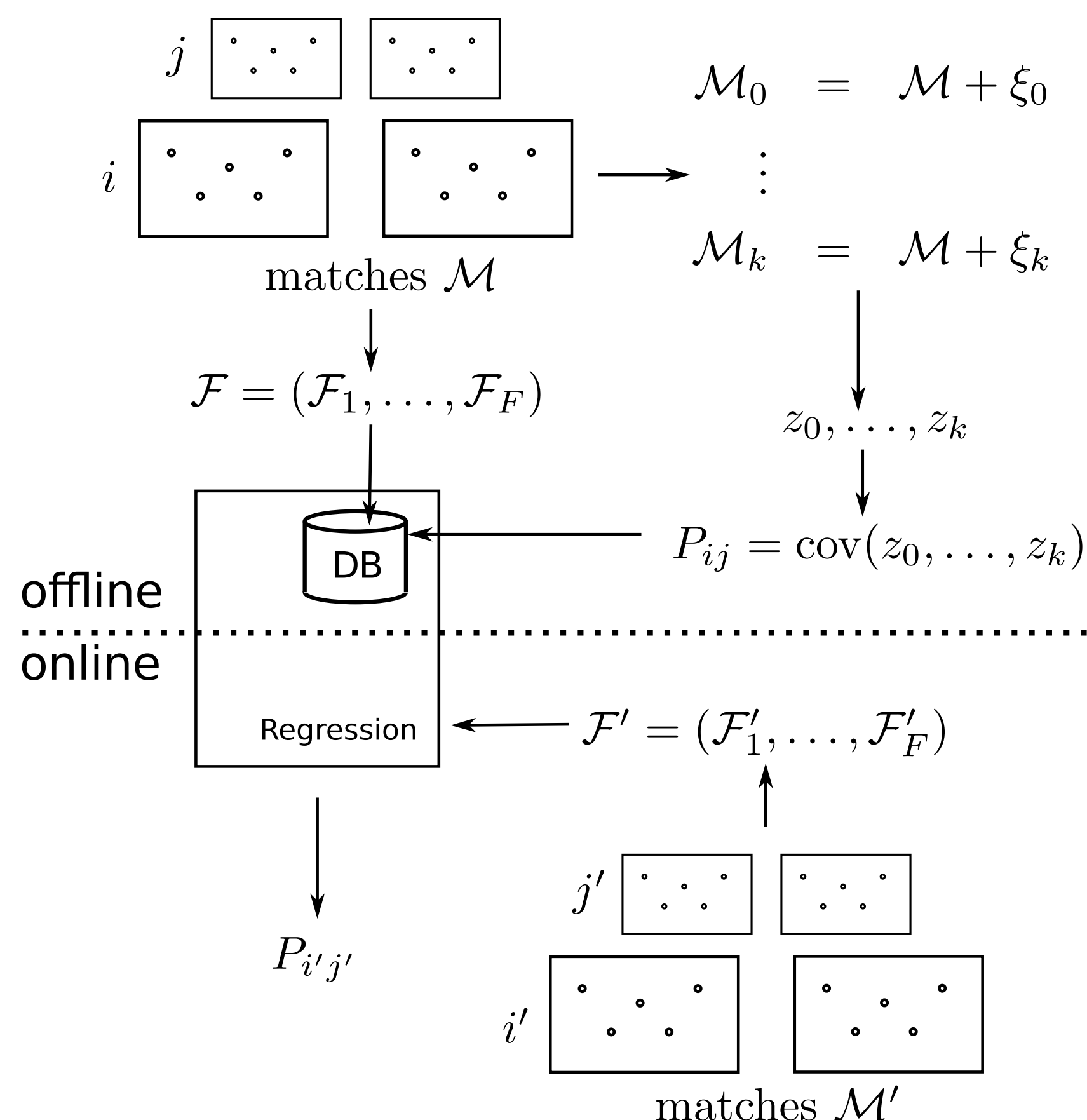
- Hence exhibiting a **greatly reduced complexity**.

Approach

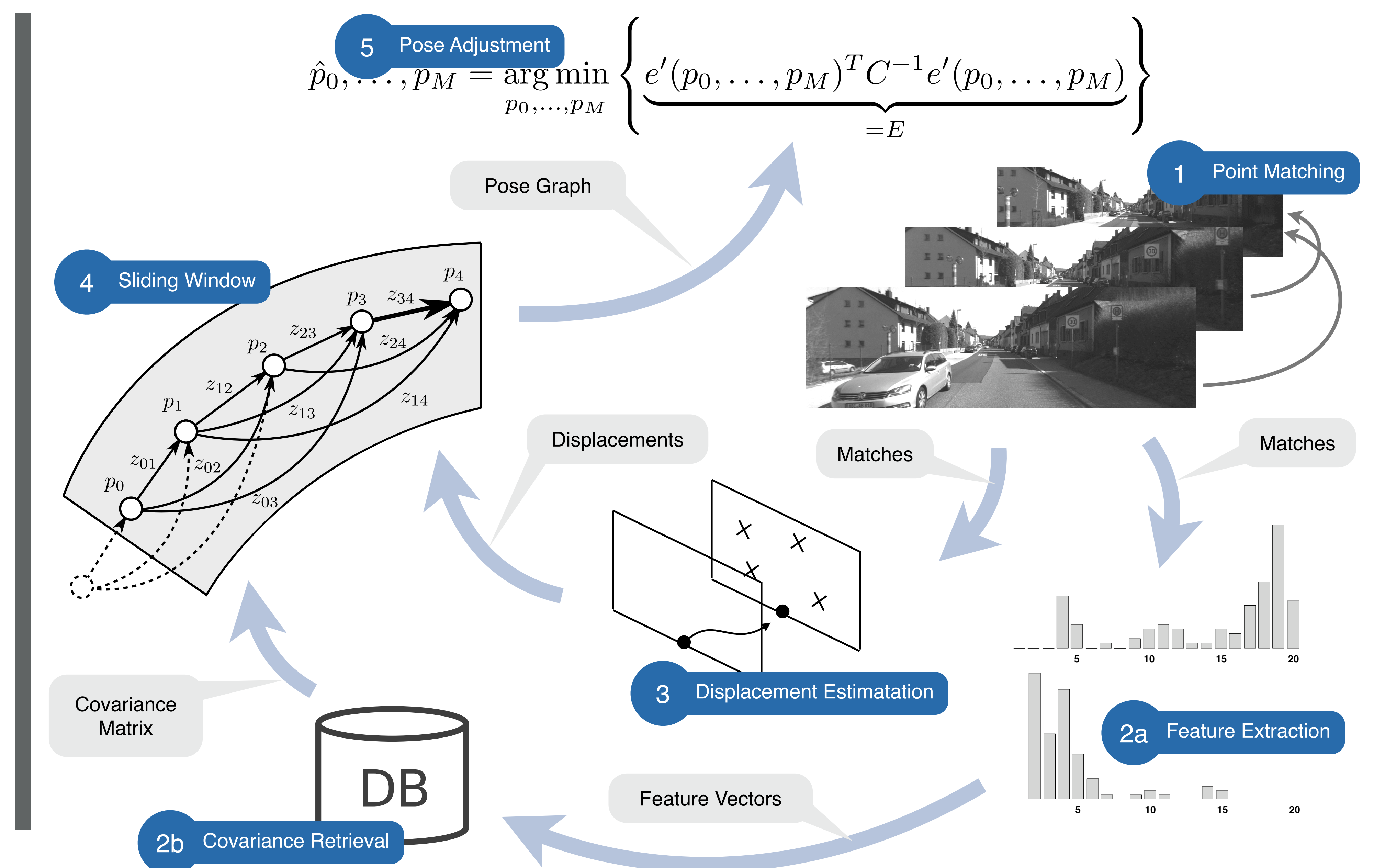
Offline Learning

A **Monte Carlo Simulation** is run offline to learn a displacement covariance database.

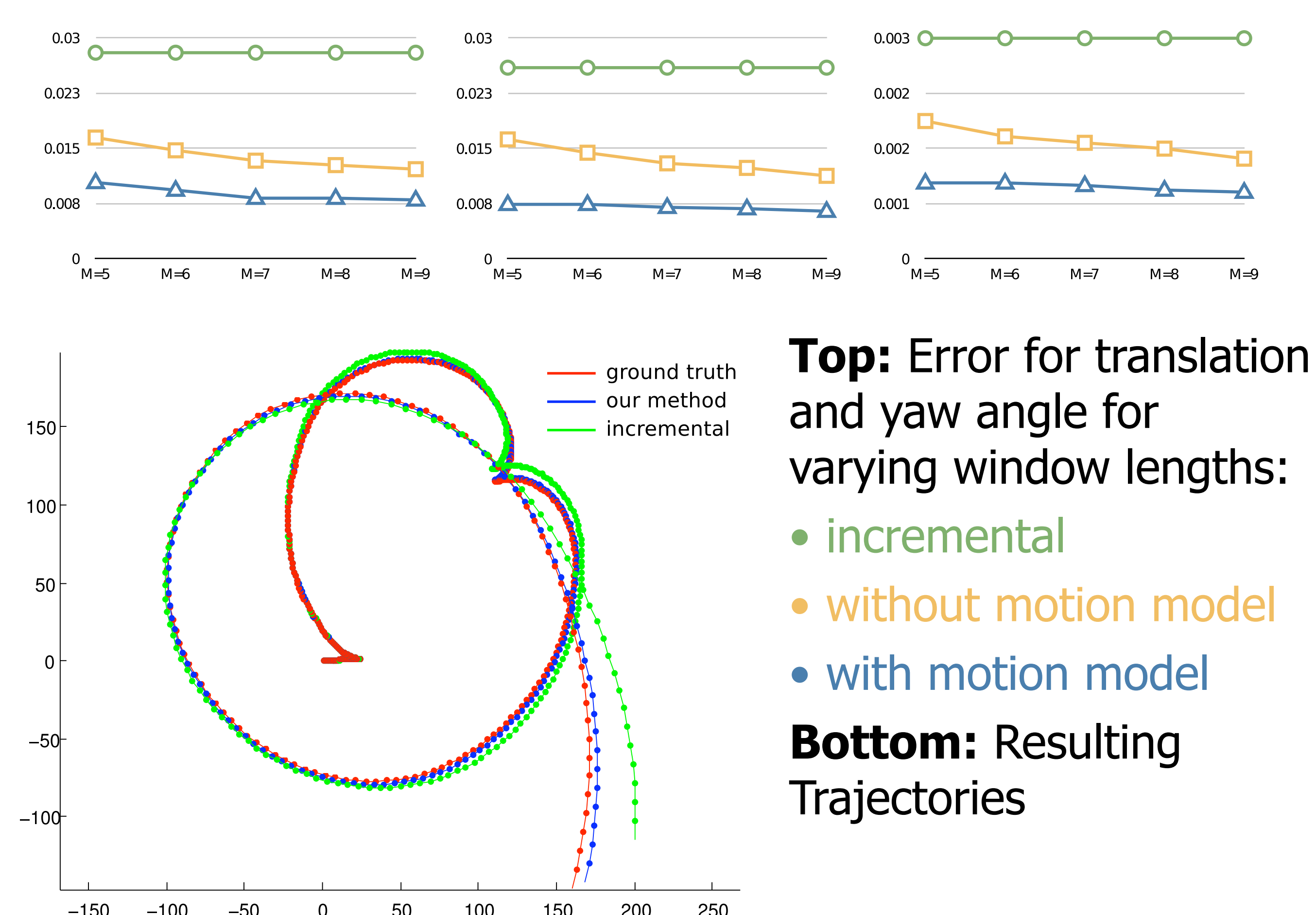
- For each frame pair one **feature vector** and one **covariance matrix** is stored.



Online Motion Estimate

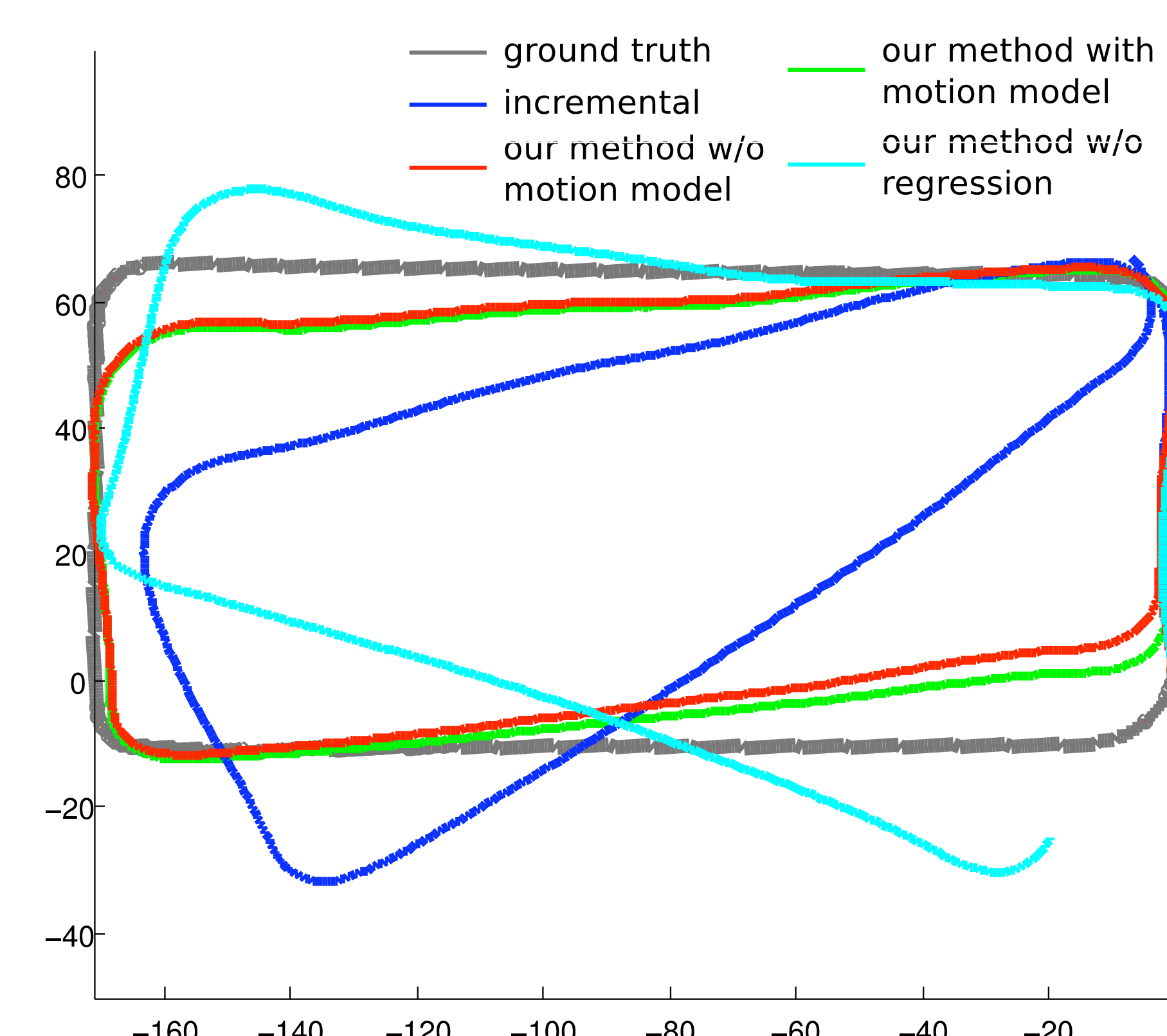


Simulation Experiments



Real World Experiment

Resulting trajectories are shown for real world data.



- Runtime for optimization: 10 ms
- Using a motion model improves results
- Considering displacement uncertainties is crucial
- Even fast incremental methods can be used