Optimization or Architecture:
How to Hack Kalman Filtering

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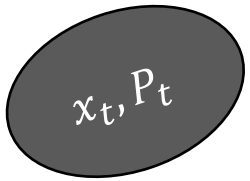
NeurIPS 2023

Background: Kalman Filter (KF)

- Goal:
  - Estimate x_{t+1} from measurements $\{z_\tau\}_{\tau=1}^{t}$



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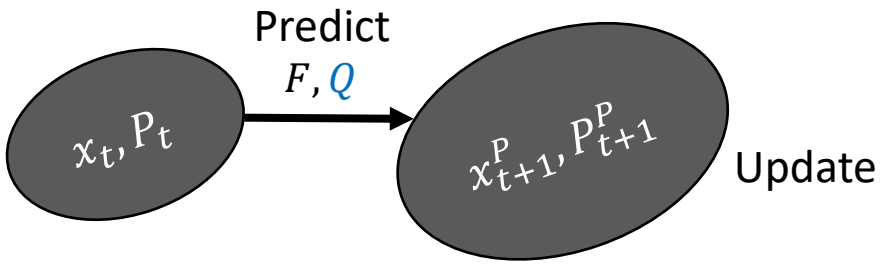

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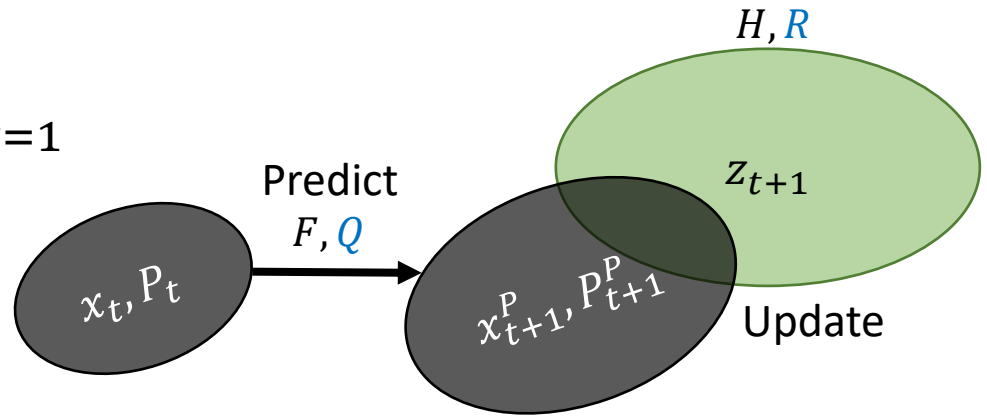

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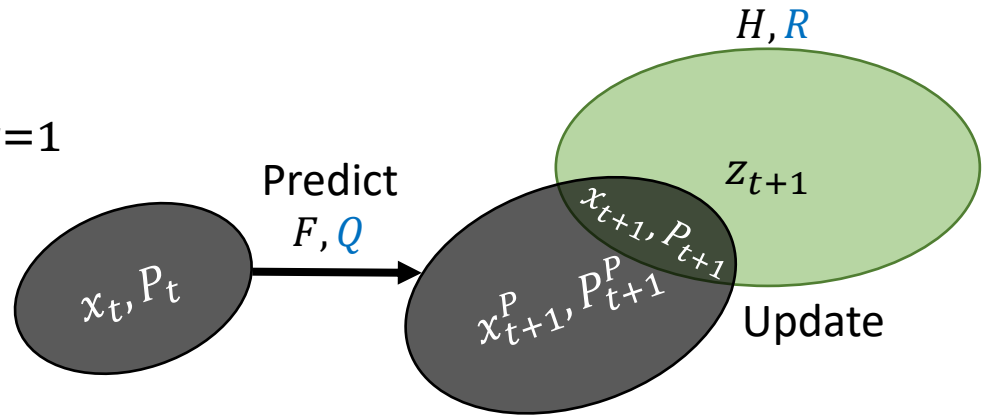

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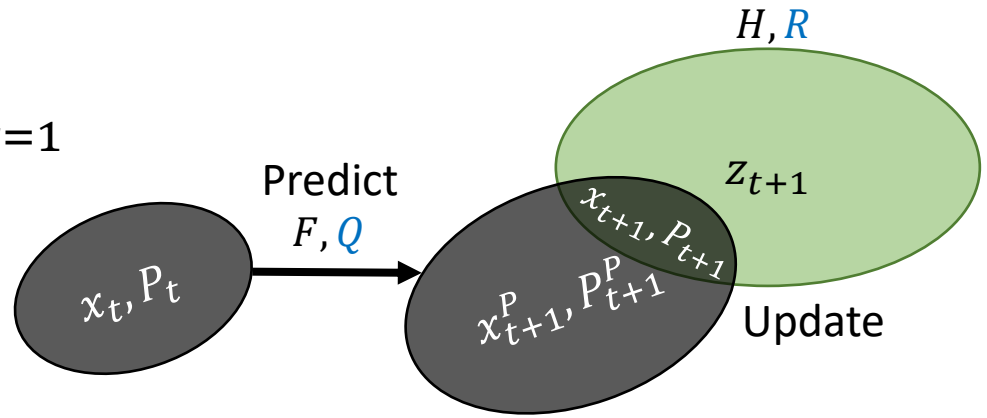

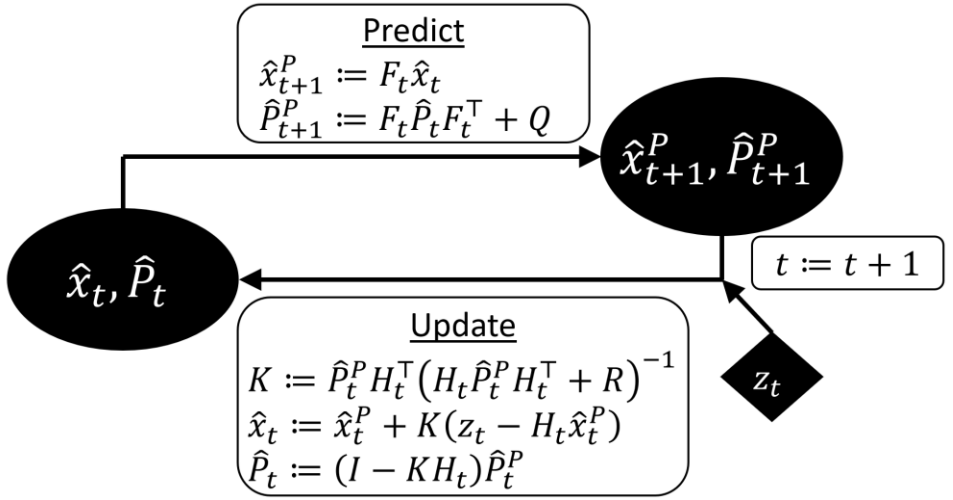

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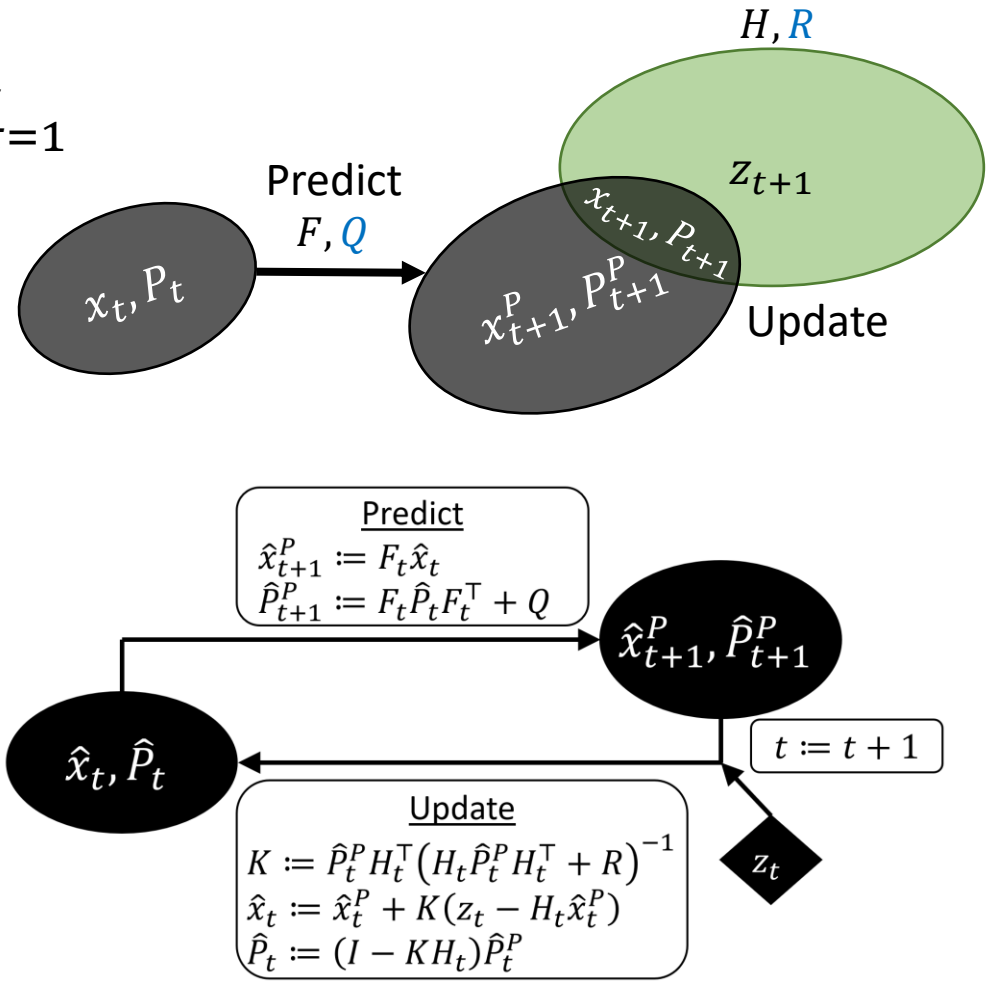
- How to know the noise Q, R?

$$Q \coloneqq Cov(\{x_{t+1} - Fx_t\}_t)$$

$$R \coloneqq Cov(\{z_t - Hx_t\}_t)$$



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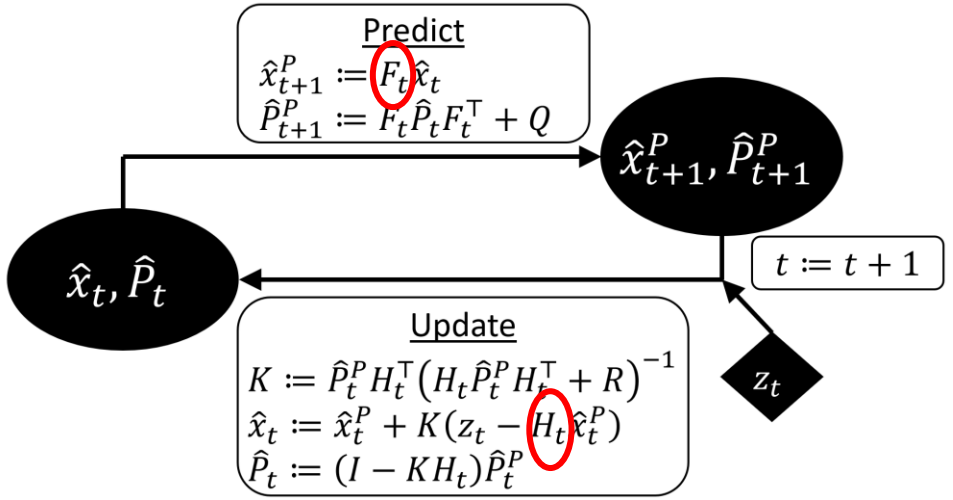

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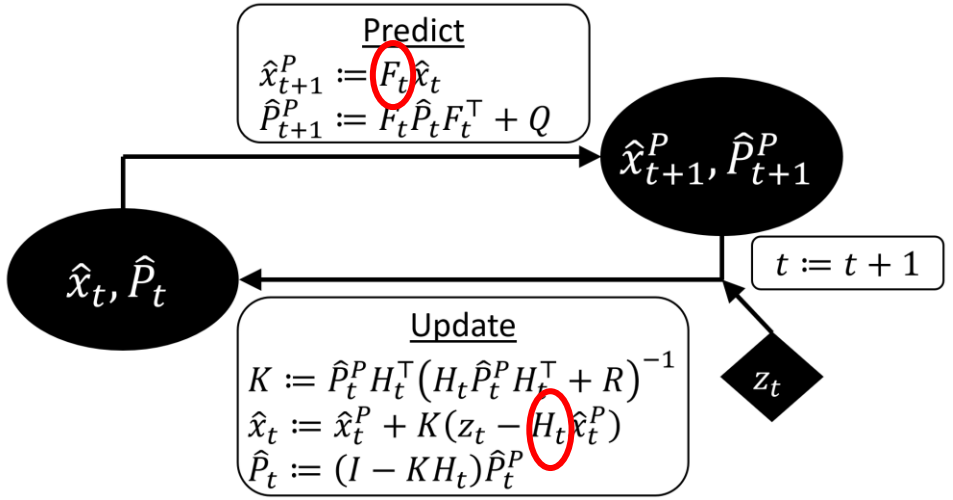

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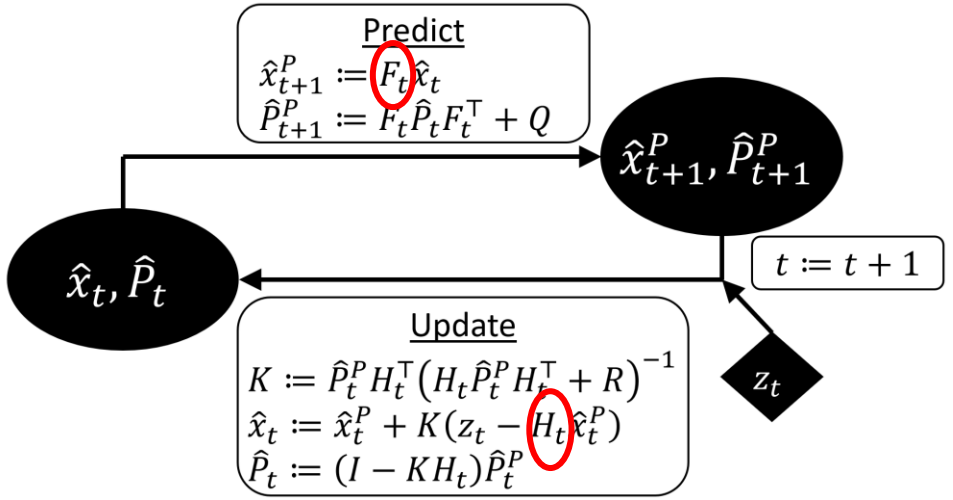

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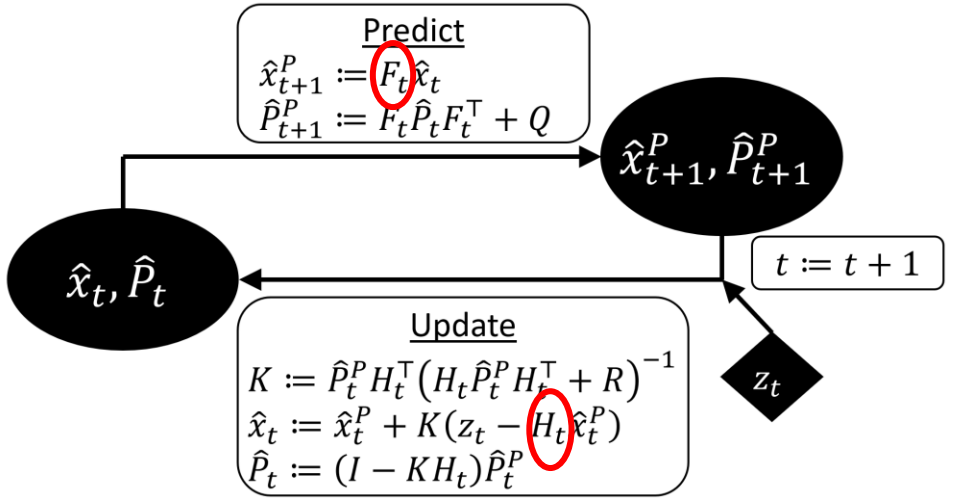

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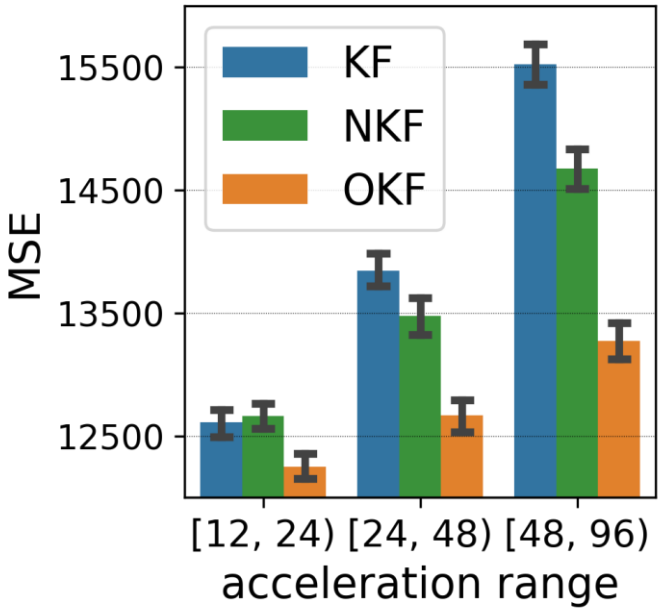
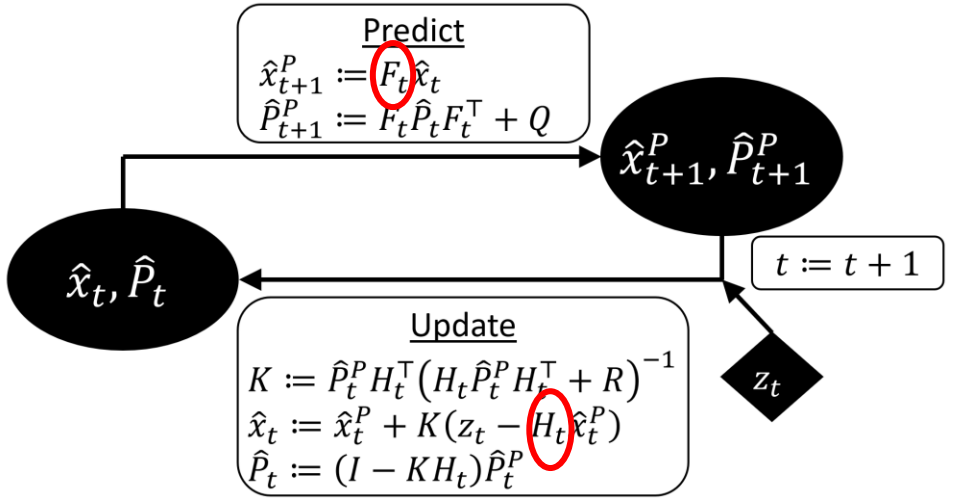
- Beats KF *and* NKF!





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  - Comparing **optimized NN** vs. **non-optimized KF** is common…
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PyPI
`Optimized-Kalman-Filter`

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