

## 1 LPV Kalman Filter Algorithm

The following algorithm is based on the functionality of the observer. A numerical simulation with the observer code is provided in the folder

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**Algorithm 1** LPV Kalman Observer

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**Require:** Input  $u(k)$ , Output  $y(k)$

**Ensure:** State estimate  $\hat{x}(k)$

- 1: Compute offline optimal gains
  - 2: Initialize observer states  $\hat{x}(0)$
  - 3: Define the total number of Steps
  - 4: Observer triggered
  - 5: **while**  $k < \text{Steps}$  **do**
  - 6:     Define the bounds of the scheduling variables
  - 7:     Compute the estimated scheduling functions  $\psi_i(\hat{\varphi}(k))$
  - 8:     Interpolate the observer gains
  - 9:      $\mathcal{L}(\hat{\varphi}(k)) \leftarrow \sum_{i=1}^{2^l} \psi_i(\hat{\varphi}(k)) \mathcal{L}_i$
  - 10:    Compute the LPV Kalman Filter and update the states
  - 11:     $k \leftarrow k + 1$  ▷ Advance one step
  - 12: **end while**
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