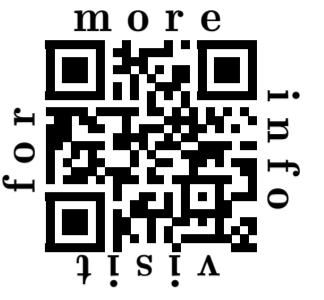
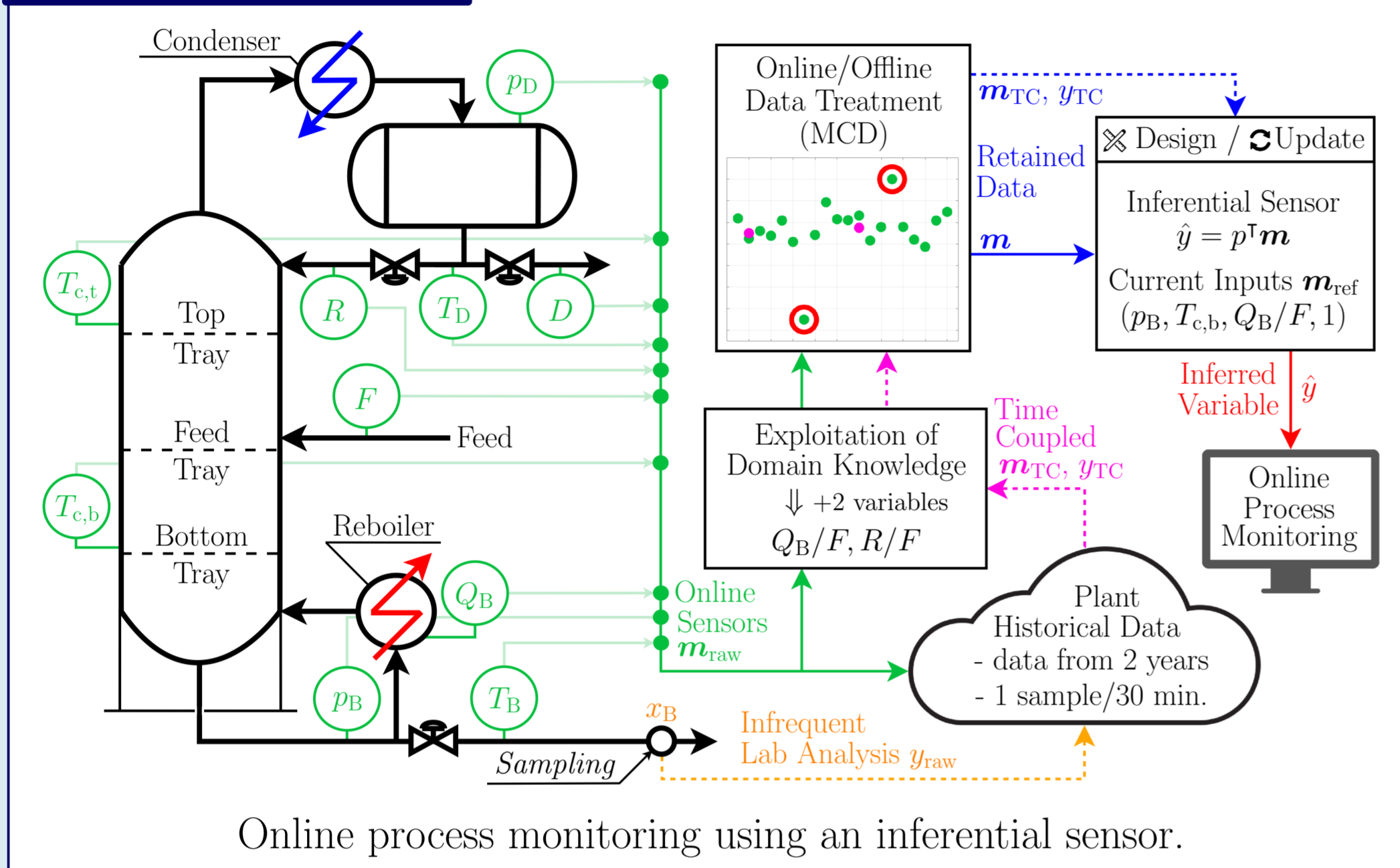


## Goals

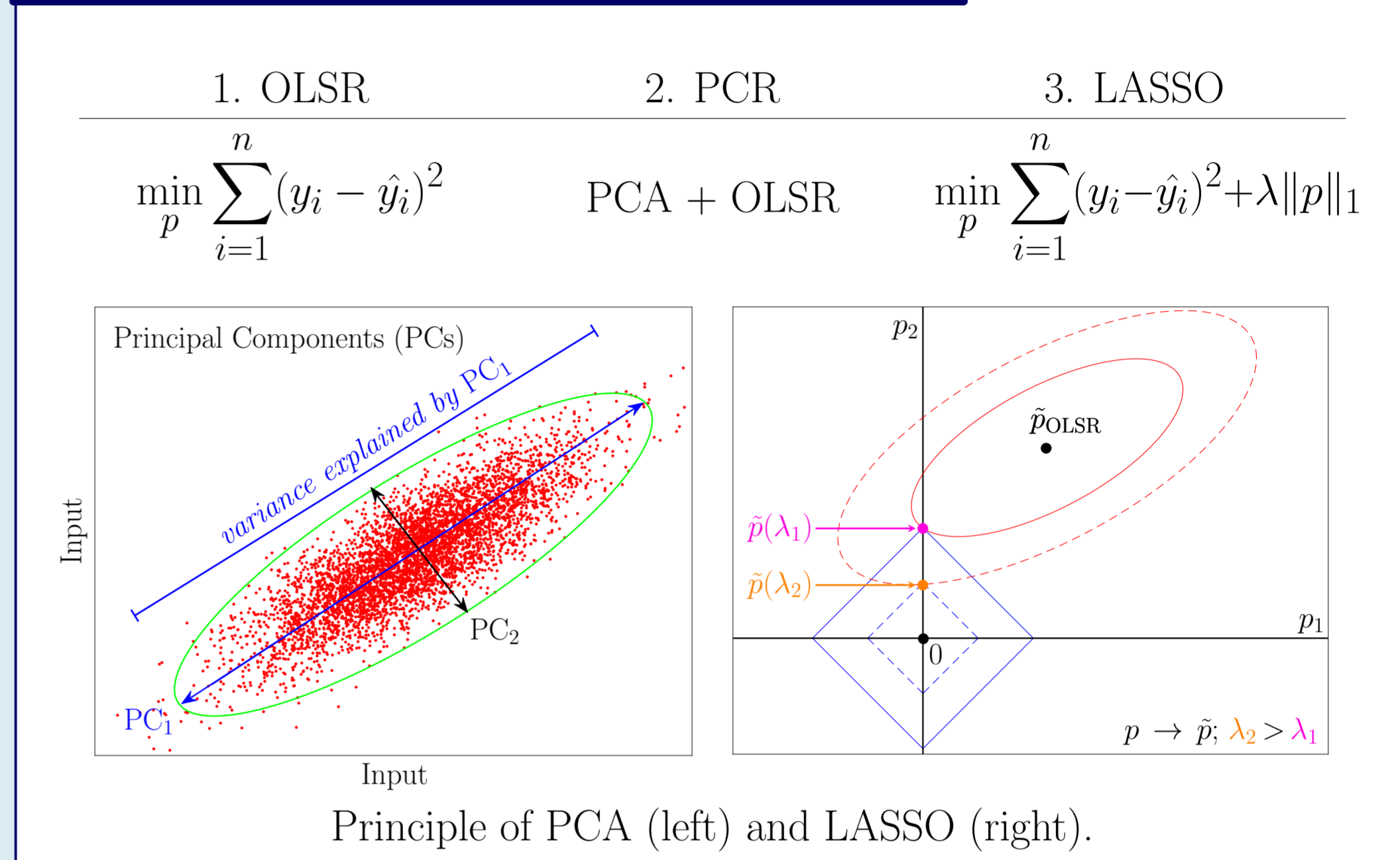
Inferential (or soft) sensors infer rarely measured or completely unmeasured variables. The main challenge in designing an inferential sensor is to select a correct structure represented by sensor input variables. This work focuses on designing an inferential sensor for an industrial depropanizer column. The raw industrial data is pre-treated by minimum covariance determinant (MCD). Subsequently, the inferential sensors are designed using several methods (OLSR, PCR, LASSO). Finally, the performance of the designed sensors is compared with the current one in the refinery.



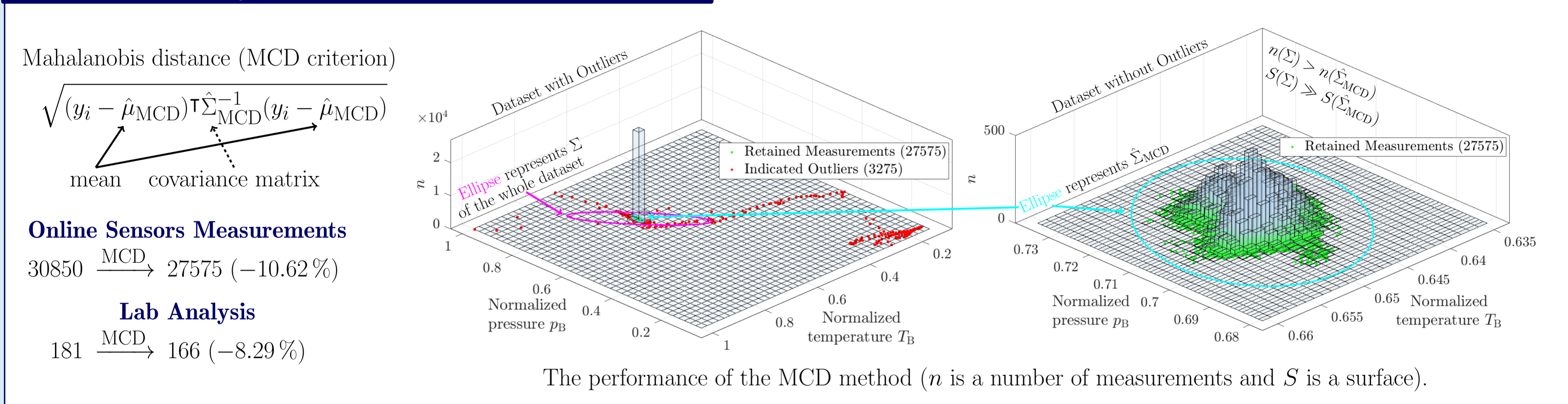
## Problem Definition



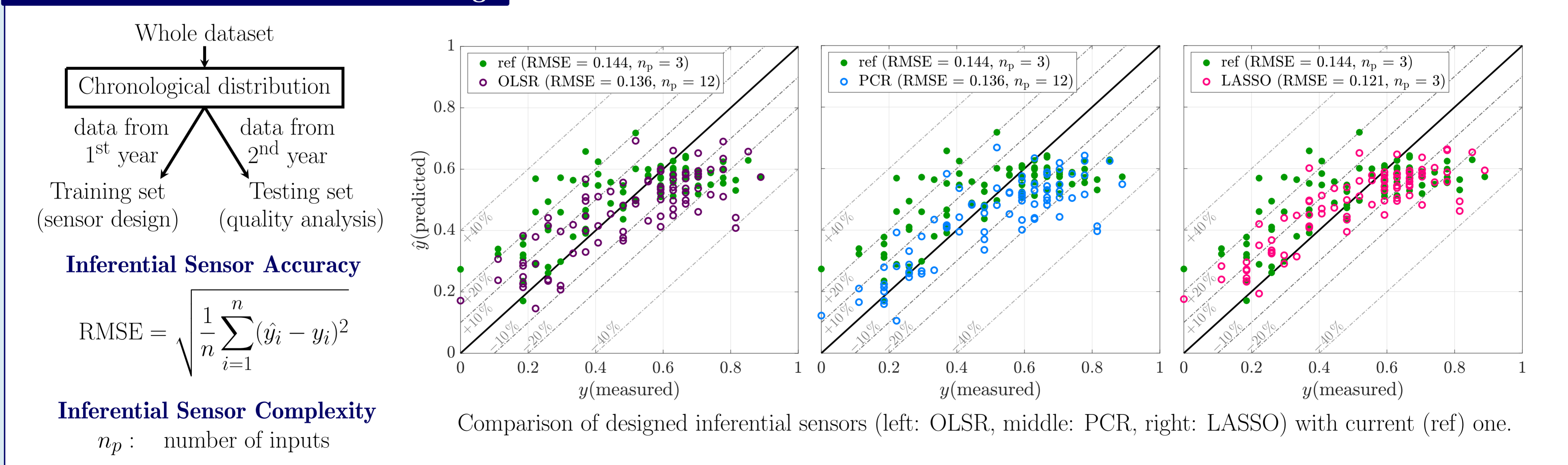
## Methods of an Inferential Sensor Design



## Data Treatment by Minimum Covariance Determinant



## Results from Inferential Sensor Design



## Conclusions

We designed the inferential sensors for the industrial depropanizer column using dataset pre-treated (removal of outliers and systematic errors) by MCD. The inferential sensors are designed by OLSR, PCR, and LASSO. The performance analysis shows that inferential sensor designed by LASSO outperforms the current (ref) one by about 16% on the testing dataset. Note that LASSO was able to maintain the simplicity of the sensor structure ( $n_p = 3$ ).