Requirements:

- Requirements
  - Heat exchanger network and base operating values
  - Measured variables and observable variables
- Rapid and reliable solution via proposed algorithms makes this method suitable for solving large scale data reconciliation problems for sites that contain many interlinked plants.

Engineering Basis:

- Data reconciliation via QR factorization
  - Eliminate unmeasured variables from process constraints
  - Reconcile measurements
  - Estimate unmeasured variables
- Sequential algorithm
  - Solve mass and LMTD approximation, followed by energy balances
- Simultaneous algorithm
  - Successive linearization of process constraints consisting of mass, LMTD approximation, and energy balances
- Minimizing the measurement variances via sequential algorithm in one iteration, while the simultaneous algorithm converges in two to three iterations.
- Detection of heat exchanger fouling with measured variables within 0.5% std. dev.
- Crude blend phase change in heat exchanger (linear)

Testing / Implementation:

- Sample other complex heat exchanger networks with phase and enthalpy change calculations imbedded in the algorithm.