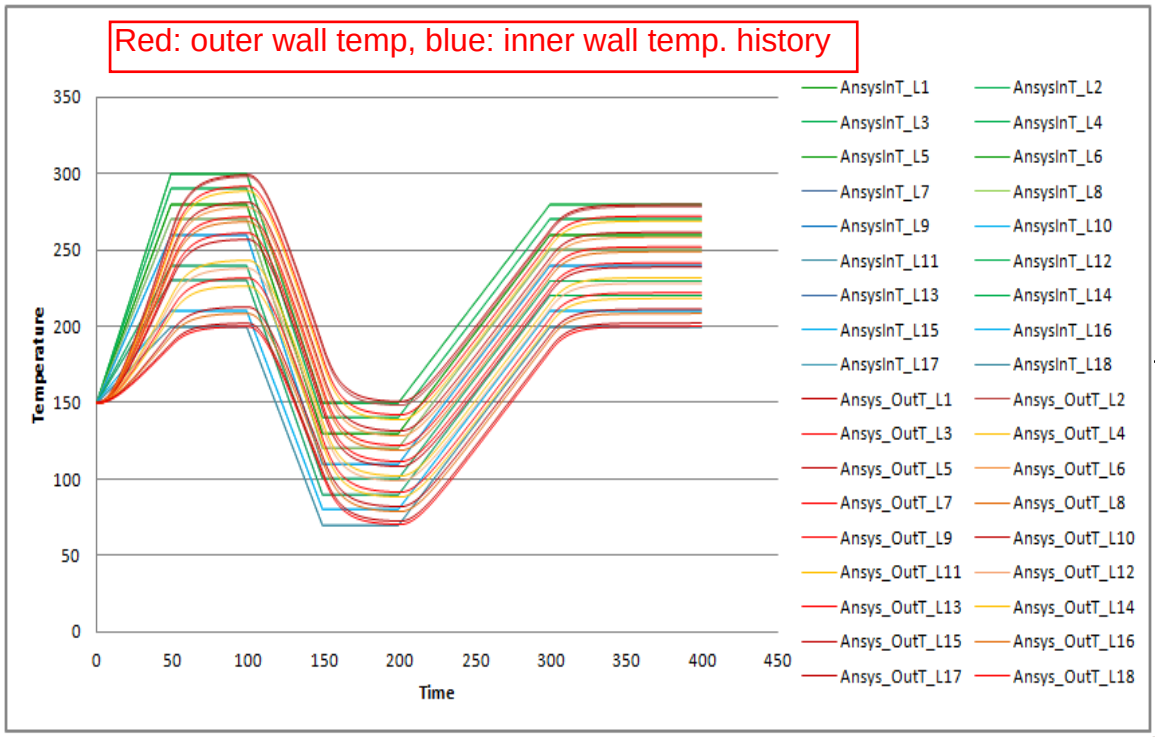
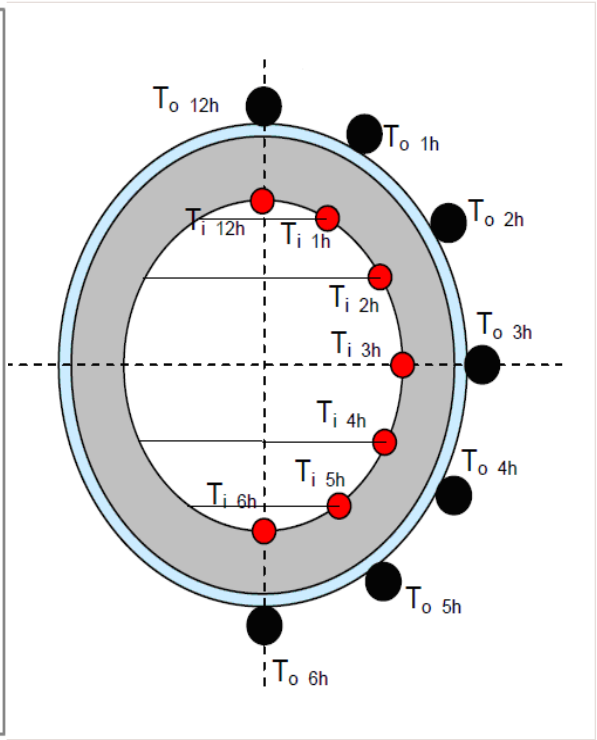
Solution of a typical IHCP

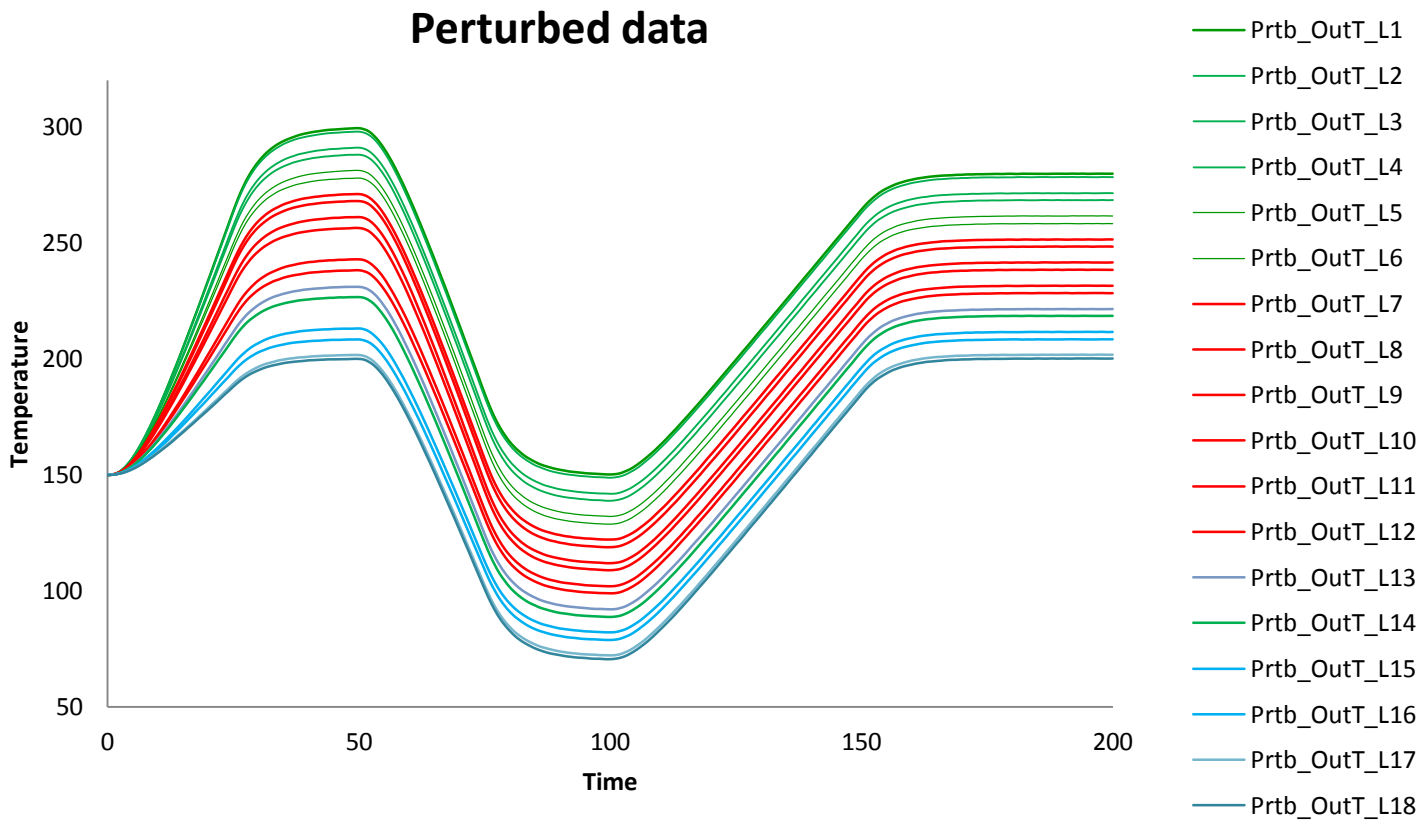




- boundary value determination inverse problem
- Very accurate approximation from accurate measured data

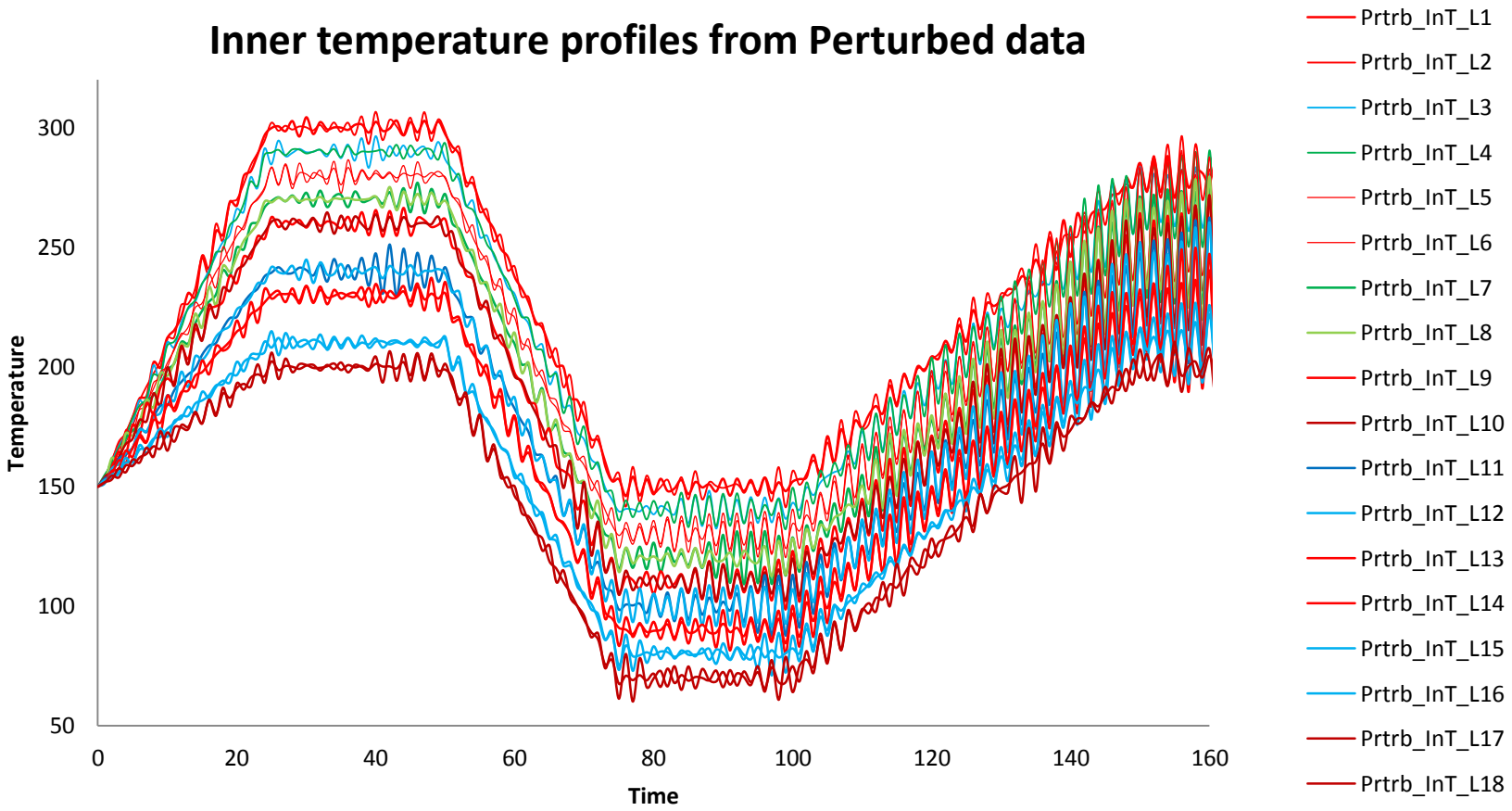
Typical problem: Perturbation effect

- Random perturbation of [-0.05 , +0.05] has been applied



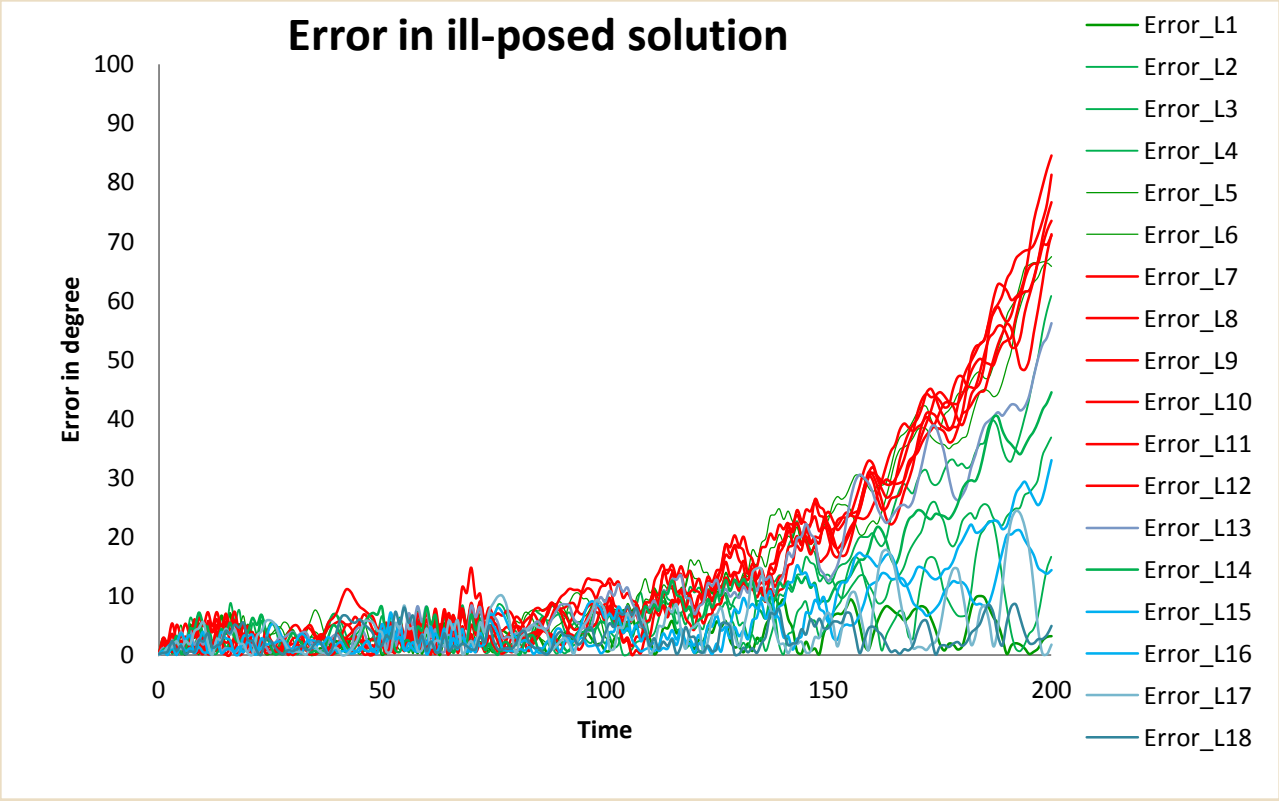
Typical problem: Perturbation effect

- Perturbation causes error in the solution upto 70/80 degree



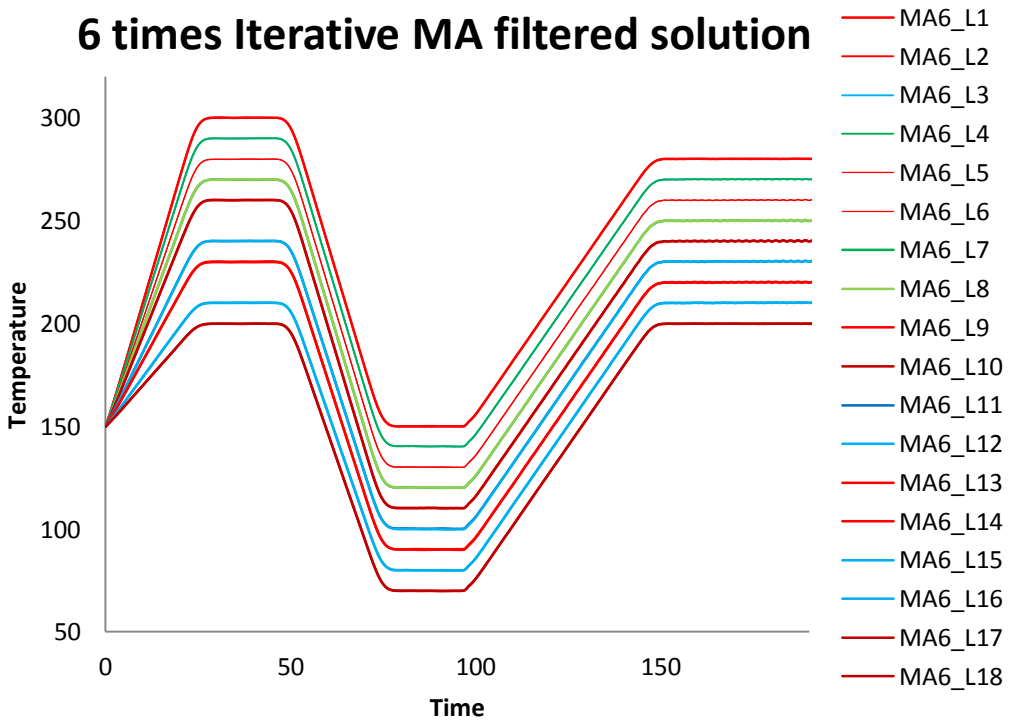
Error in the solution from Perturbed data

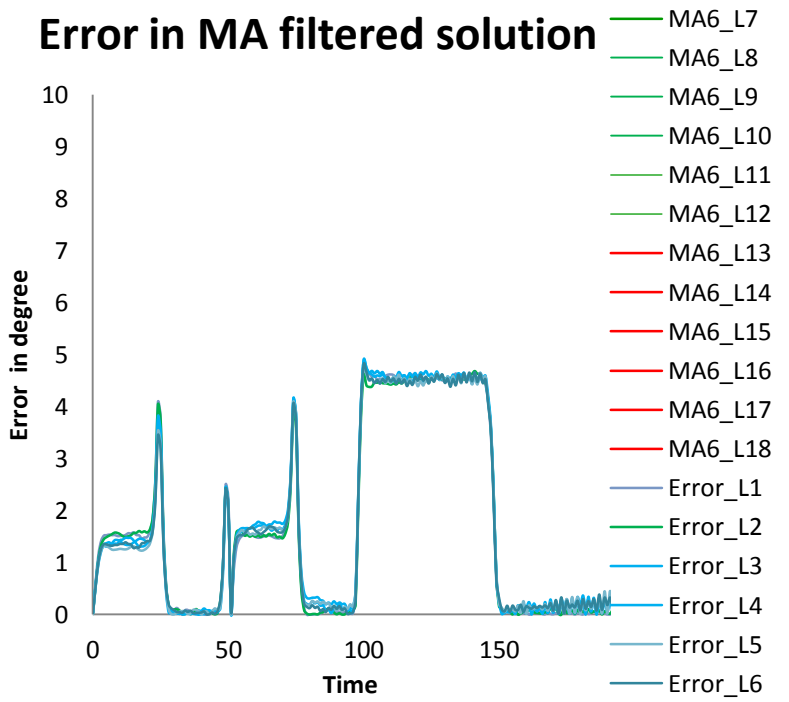
- Error amount is increasing with computations, as high as 80 degree



Filtering of the Solution: Moving Average

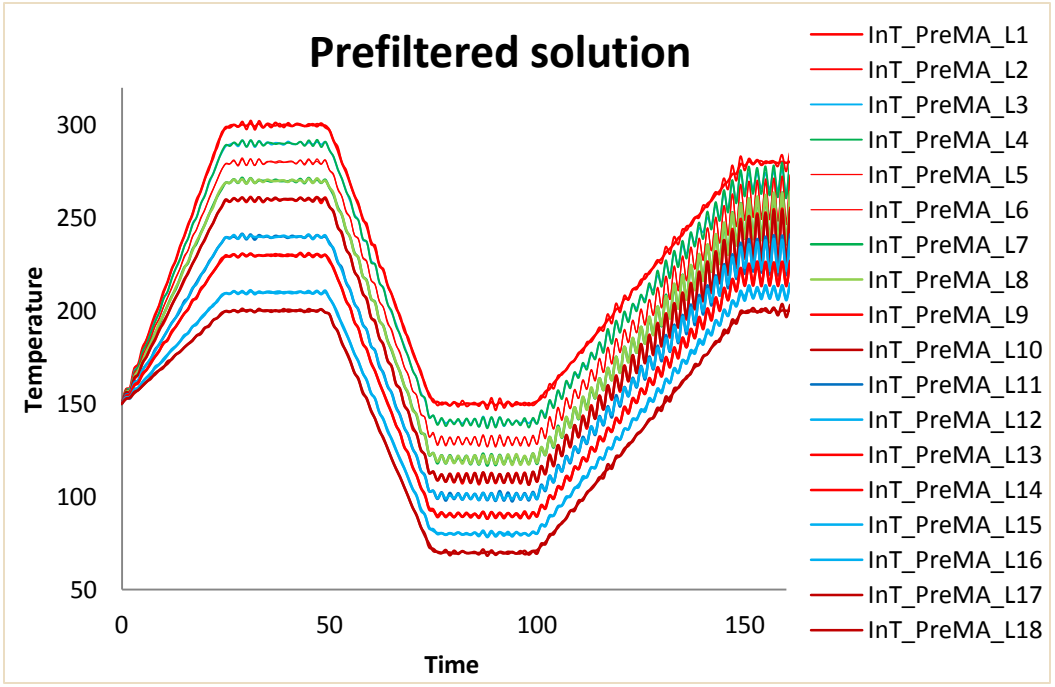
- Moving Average Filter, simplest one: $y[i] = \frac{1}{M}\sum_{j=0}^{M-1} x[i+j]$
- Sixth times iterative MA filtering force the error below 5 degree

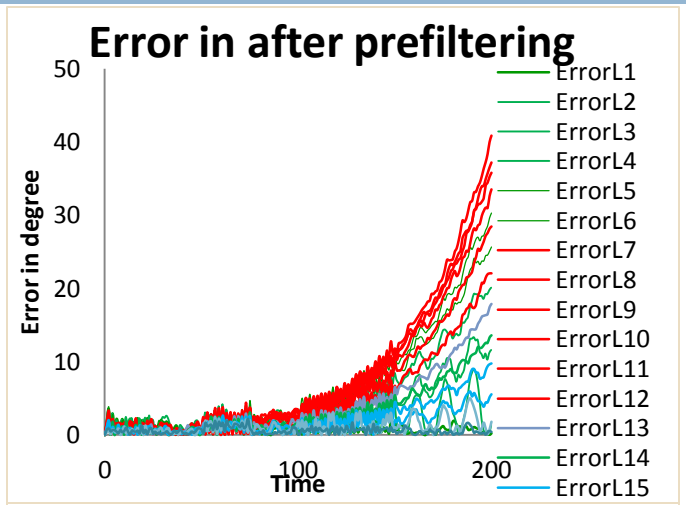


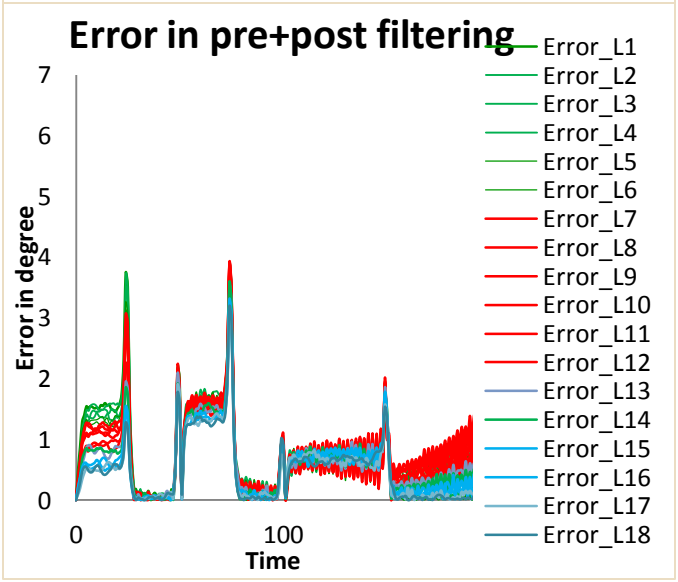


Pre- and Post filtering Effect

- Third time iterative MA filtering results error < 4 degree

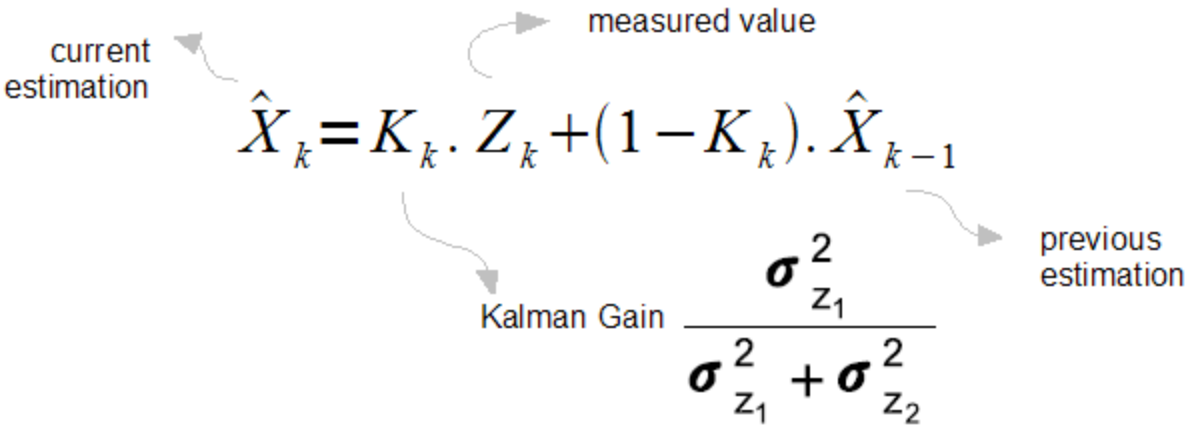






Kalman Filter

- Optimal estimator of a state, Recursive Data Processing Algorithm
- Determination of planet orbit, Satellite navigation system, Dynamic positioning, Ensemble KF in fluid flow estimation through heterogeneous rock
- Tracking targets - eg aircraft, missiles using RADAR



Effect of Kalman Filtering

- Second iterative Kalman Filtering results < 3 degree