Skoltech

Skolkovo Institute of Science and Technology

“Space Data Processing: Making Sense of Experimental Data”

Final project Discussion

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Part I. Find best approximation method

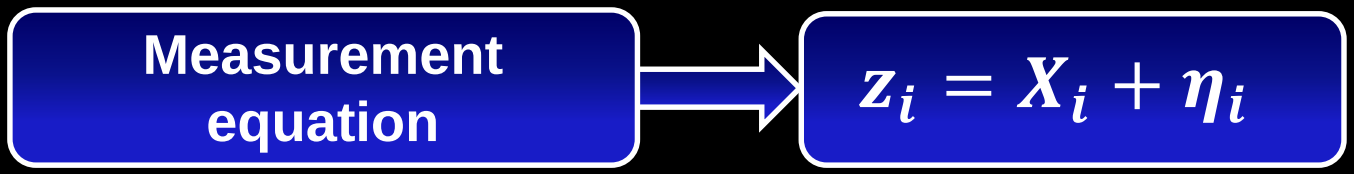
Experimental data

Group 1	Group 2	Group 3
Mean arterial pressure	Sunspot numbers	Solar radio flux at F10.7 cm.

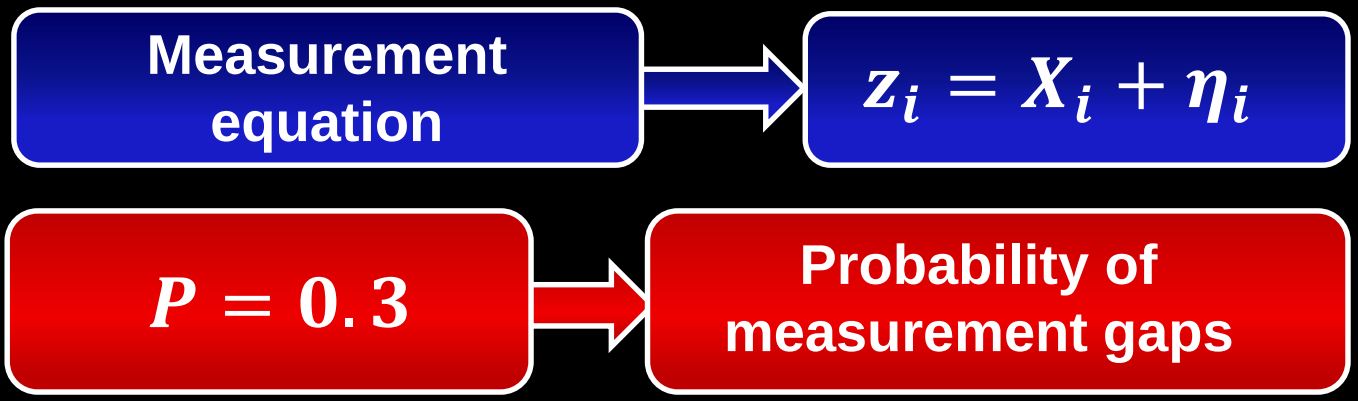
Goals

1. Why it is the best method?
2. Any regularities?
3. Risks of conclusions

Part II. Tracking and forecasting in conditions of measurement gaps



Part II. Tracking and forecasting in conditions of measurement gaps



Part II. Tracking and forecasting in conditions of measurement gaps

Measurement equation → $z_i = X_i + \eta_i$

$P = 0.3$ → Probability of measurement gaps

g_i → Uniformly distributed random value in range (0,1)

Part II. Tracking and forecasting in conditions of measurement gaps

Measurement equation → $z_i = X_i + \eta_i$

$P = 0.3$ → Probability of measurement gaps

g_i → Uniformly distributed random value in range (0,1)

$g_i \leq 0.3$ → Gap

Part II. Tracking and forecasting in conditions of measurement gaps

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Prediction (extrapolation)

$X_{i+1,i}$ → **Extrapolated estimate**

$P_{i+1,i}$ → **Prediction error covariance matrix**

Part II. Tracking and forecasting in conditions of measurement gaps

1. **Prediction (extrapolation)**

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$P_{i+1,i}$ → Prediction error covariance matrix

2. **Filtration is done only if measurements at step i are available**

$X_{i+1,i+1}$ → Filtered estimate

$P_{i+1,i+1}$ → Filtration error covariance matrix

Part II. Tracking and forecasting in conditions of measurement gaps

1. **Prediction (extrapolation)**

$X_{i+1,i}$ → Extrapolated estimate

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2. **Filtration is done only if measurements at step i are available**

$X_{i+1,i+1}$ → Filtered estimate

$P_{i+1,i+1}$ → Filtration error covariance matrix

3. **If measurements at step i are not available, then filtered estimate is equal to extrapolated estimate**

$$X_{i+1,i+1} = X_{i+1,i}$$

$$P_{i+1,i+1} = P_{i+1,i}$$

Important dates

❶ **Tuesday, May 23** **Exam**

❷ **Wednesday, May 24** **Project presentation**

❸ **Friday, May 26** **Project submission**