# "Space Data Processing: Making Sense of Experimental Data"

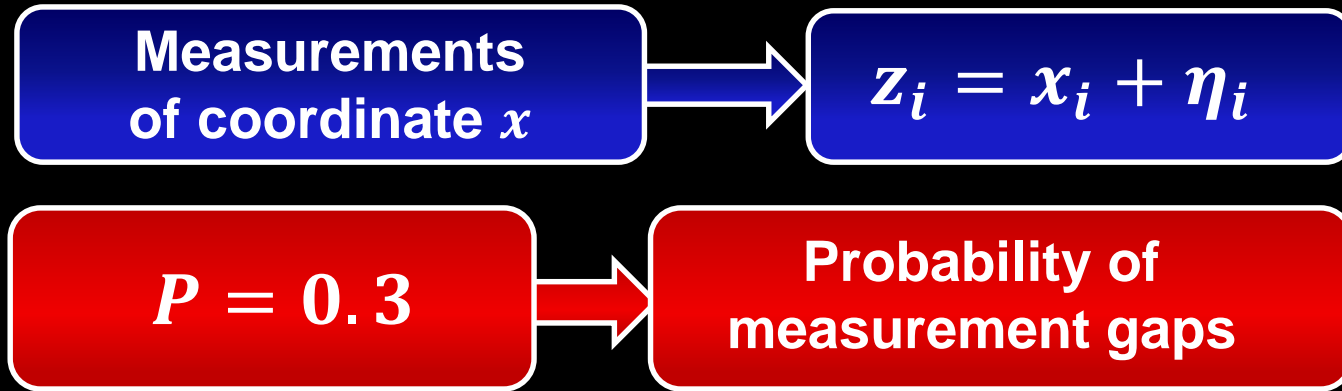## Assignment 8
Tracking and forecasting in conditions of measurement gap

Tatiana Podladchikova
Term 1B, October 2019
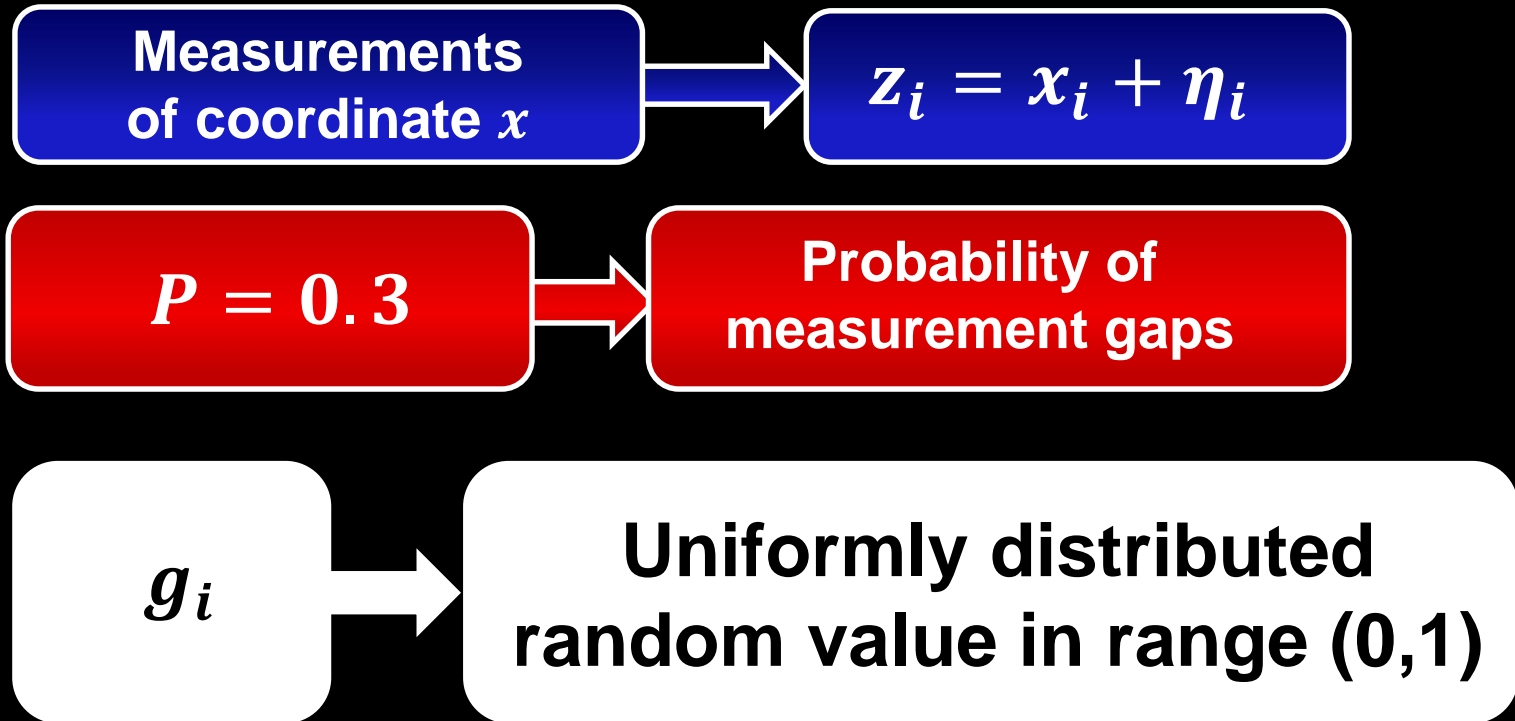**t.podladchikova@skoltech.ru**

Tracking and forecasting in conditions of measurement gaps

Measurements of coordinate x $\Rightarrow$ $z_i = x_i + \eta_i$

Tracking and forecasting
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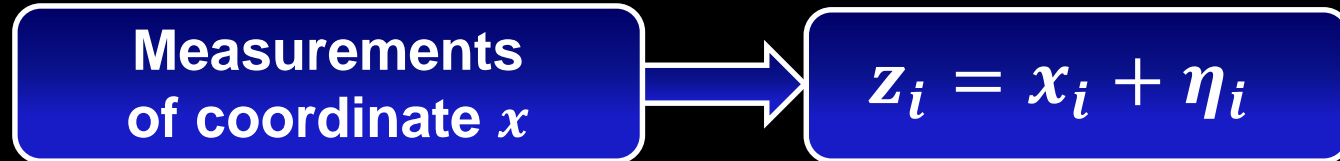
| Measurements of coordinate x | $\rightarrow$ | $z_i = x_i + \eta_i$ |

| $P = 0.3$ | $\rightarrow$ | Probability of measurement gaps |

Tracking and forecasting in conditions of measurement gaps
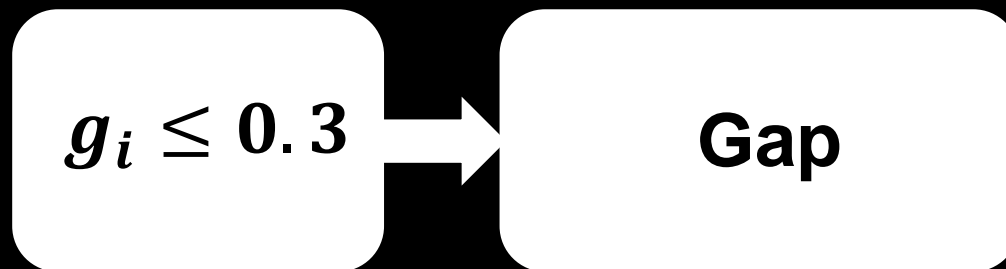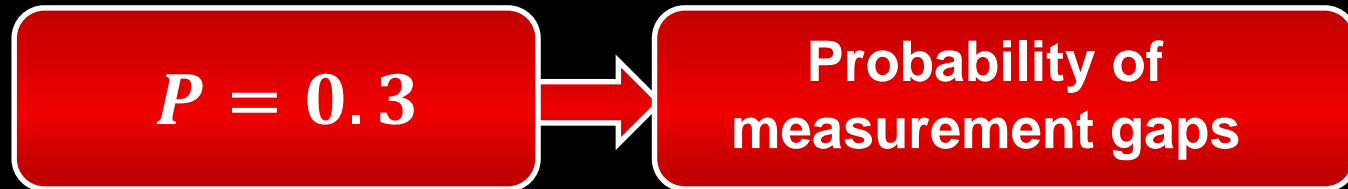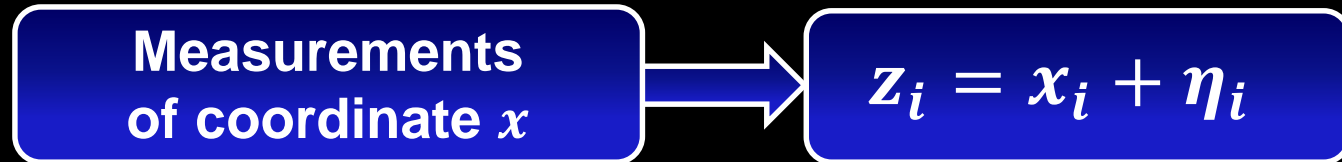
Measurements of coordinate x $\rightarrow$ $z_i = x_i + \eta_i$

$P = 0.3$ $\rightarrow$ **Probability of measurement gaps**

g_i $\rightarrow$ **Uniformly distributed random value in range (0,1)**

Tracking and forecasting in conditions of measurement gaps

Prediction (extrapolation)

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

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

Tracking and forecasting in conditions of measurement gaps

① **Prediction (extrapolation)**

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

$P_{i+1,i}$ → **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**

Tracking and forecasting in conditions of measurement gaps

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$X_{i+1,i+1}$ → **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

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

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