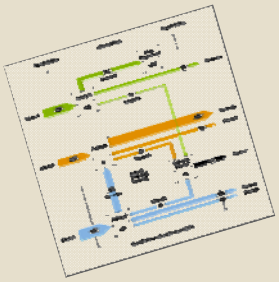

Material Flow Analysis with Software STAN

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Software for Substance Flow Analysis

STAN

Vienna University of Technology

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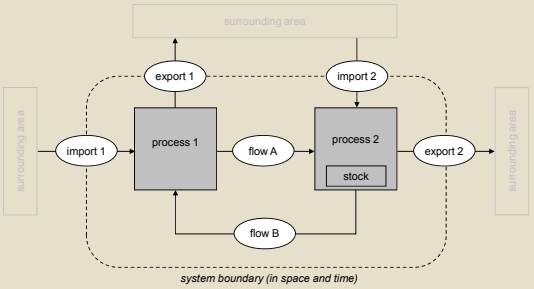
Published by: Institute for Water Quality, Resources and Waste Management.

download: www.iwa.tuwien.ac.at

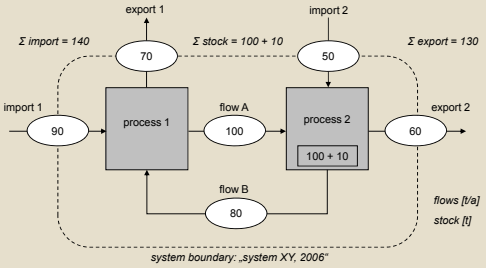
Definition Material Flow Analysis (MFA)

Material Flow Analysis (MFA) is a tool for describing and analysing complex systems with respect to goods and substances.

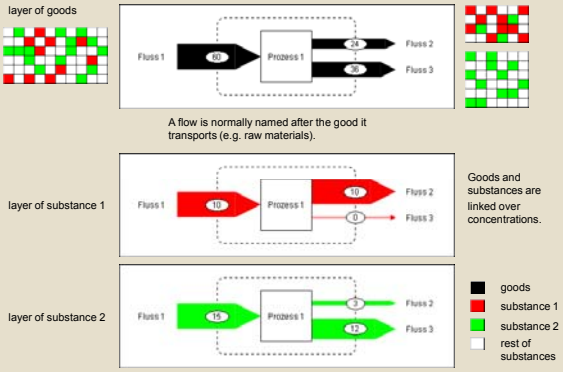
Build-up of MFA models (1)



Build-up of MFA models (2)



Goods vs. Substances



C. F. Gauss (1777-1855)

mean value:

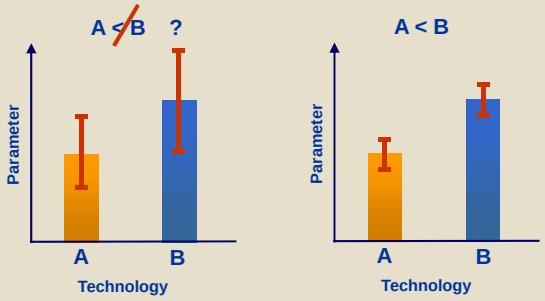
$$\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i$$

standard deviation:

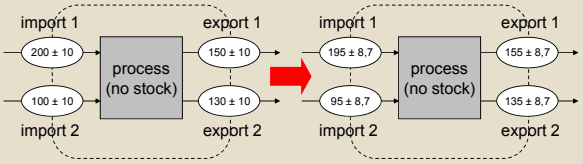
$$s = \sqrt{\frac{1}{n-1} \cdot \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

normal distribution

Comparison of Values



Data Reconciliation (1)



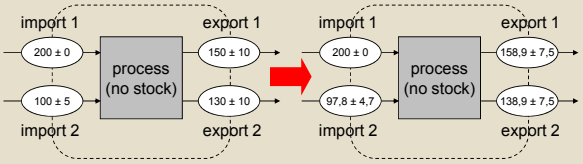
∑ import ≠ ∑ export !

1 balance equation
0 unknown variables
→ „overdetermined“
→ uncertainties given
→ data reconciliation!

→ ∑ import = ∑ export !

→ uncertainties are reduced !

Data Reconciliation (2)

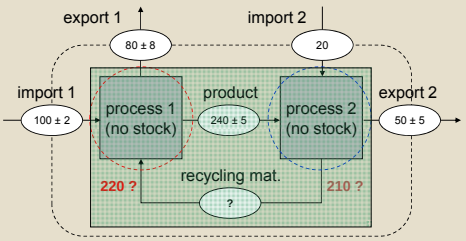


∑ import ≠ ∑ export !

→ ∑ import = ∑ export !

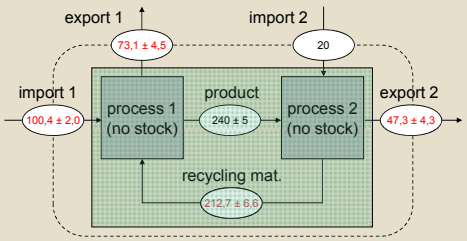
→ values with higher uncertainty are reconciled stronger!

Data Reconciliation (3)



Data Reconciliation (4)

data reconciliation



calculation
+ error propagation

Thanks for your attention !