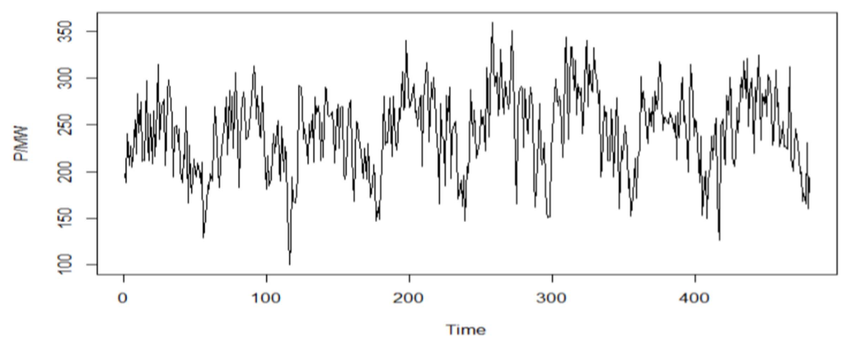
Peaks in Load

BA: Patrick Tanner, Jérôme Hui (WI, FS16)
Betreuer: Christoph Zaugg, Manfred Hertwig

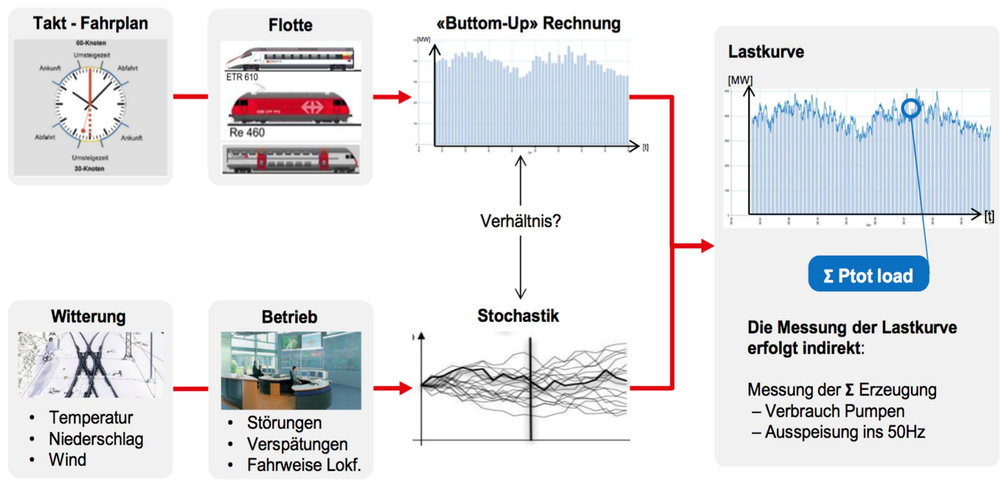
Zurich University of Applied Sciences
School of Engineering
IAMP Institute of Applied Mathematics and Physics

SBB: electric power supply



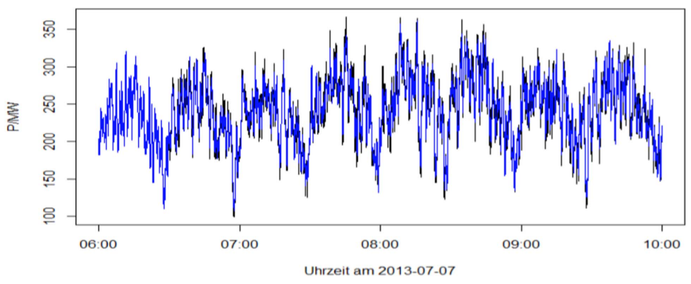
day : 07.07.2013
time : 06.00-10.00
interval : 30 seconds

stochastics <-> determinism



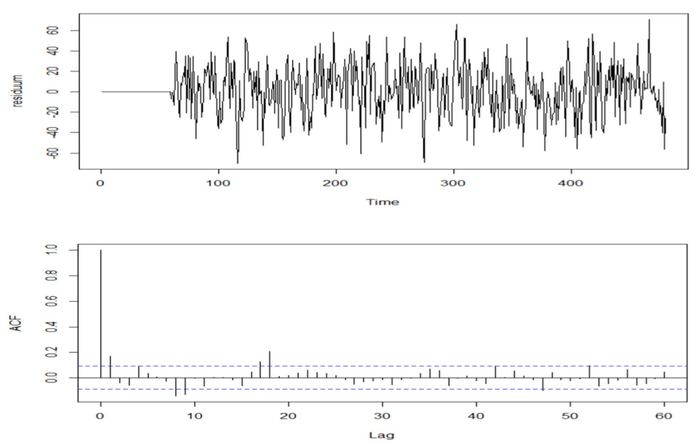
Decomposition

deterministic component



filter : low-pass (250 components)
black : total power load
blue : filtered values

stochastic component

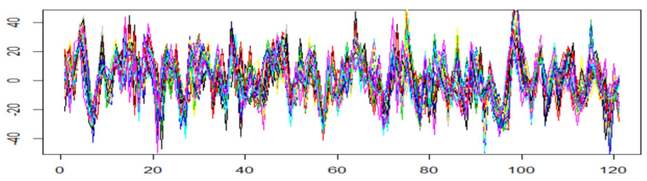


Model: stochastic component

SDE with regime-switching:

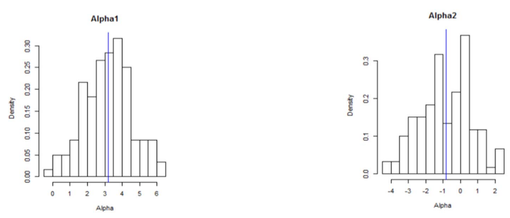
$$X_{n,i} = \alpha_i + (1-\beta_i) \cdot X_{n-1,i} + \sigma_i \cdot |X_{n-1,i}|^{\gamma_i} \cdot dW_n$$

input: 30 trajectories

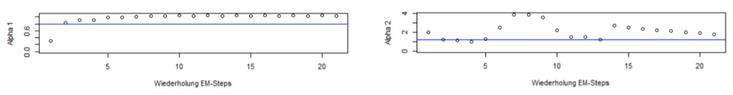


output: estimation of parameters

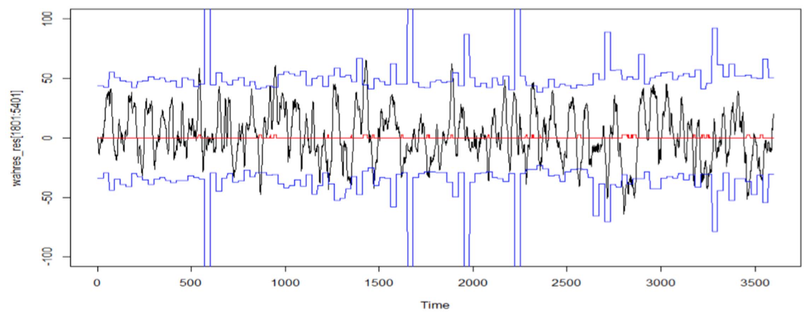
regimes:



convergence (EM-algorithm)



Validation



load profile : 07.07.2013, 07.30-08.30
black : stochastic component
blue : 94 % confidence intervall
red : performance