Automatic container model crane

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Gruppe 633

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Force estimation

Force estimation

Force estimation model

- Model approach
- Nonlinearities in the EndoWrist dynamics
  - Hammerstein Wiener Models

Figure : Hammerstein-Wiener model.

Force estimation model
Linear model

- Linear model
  - Choice of inputs affects model quality
  - Inputs: effort, velocity
  - Outputs: force
- Black-box identification
  - Subspace identification
  - Hankel singular value analysis

Include picture with effort force fit here!!

Force estimation model

Hammerstein Wiener Models

- Input and output nonlinearities
  - Effort
  - Force

Include picture with effort force fit here!!

Force estimation model
Hammerstein Wiener Models

- Nonlinearities
  - Deadzone nonlinearities
  - Input/Output -saturation

State estimation

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- The state estimates can be used in a state feedback loop to change system dynamics
- This means that reference following capabilities can be added to the system, dispite the nonlinear characteristics of the dynamics

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- Simulation results show that full reference following is possible despite the input nonlinearities in the system
- While the transient behaviour of the reference value is replicated, offsets and parasitic gains need to be compensated
- Could be implemented with improved model, doesn't improve estimate of current one.