

SUCCESSFUL IDENTIFICATION

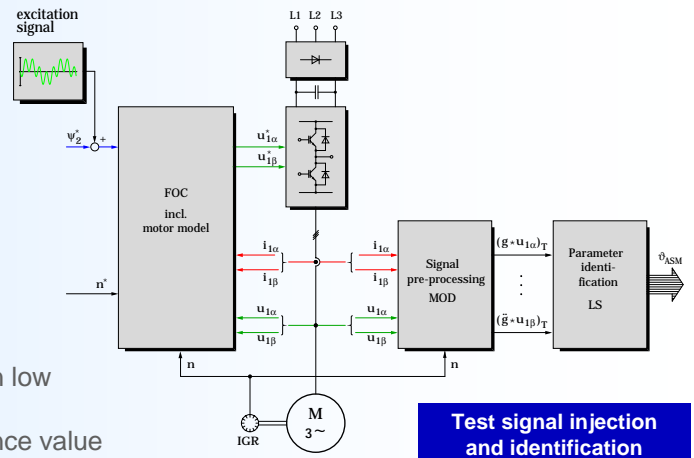
...needs proper excitation.

Through high dynamic operating case

- Periodic reversing operation
- Start-up
- Dynamic load conditions

or injection of excitation signals.

- Excitation signal injection enables identification in low dynamic operation (e.g. stationary operation)
- Sinusoidal signal injection to the rotor flux reference value
- Small magnitude signal does not produce torque ripples, but improves the excitation!



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...needs accurate measuring and intelligent signal pre-processing.

Measuring with voltage-to-frequency conversion

- Optical fibre, no EMV problems, electrical isolation
- All measuring equipment placed in the motor terminals
- Simple hardware counters on DSP side

Signal filtering via DSP

- Filtering with modulating (MOD) functions to overcome the problems of derivating measured (noisy) values

Identification with LS algorithm

- Fast recursive version for online identification

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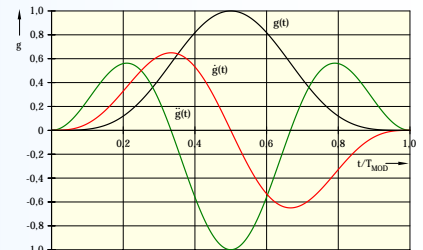
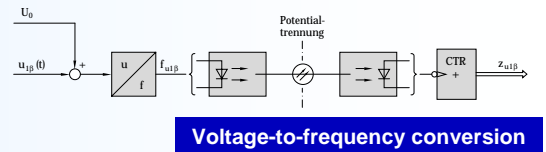
...needs experimental verification.

Torque estimation with different motor models

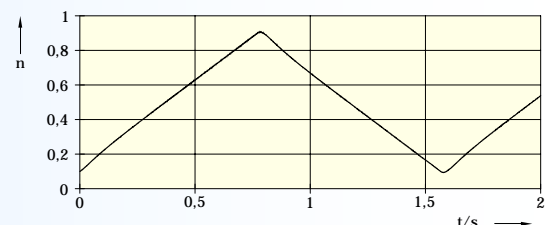
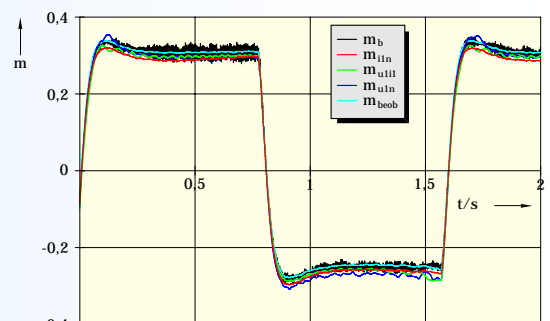
- Parameter detuning leads to torque process distortion.
- Different motor models demand different parameters, thus distortion will be specific for each model.
- Only perfect parameters give consistent torque processes.
- Needs high dynamic operating case (reversing operation)

Speed estimation (MRAS)

- Comparison to the measured speed.



MOD functions



Torque comparison for perfect parameters