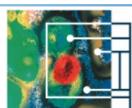


**Vortrag
zur Forschungspraxis**

**Aufbau eines „Lego-Mindstorm“
Einachs-Rollstuhls**

Korbinian Müller

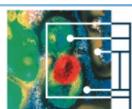
**Betreuer: M.Sc. Michael Häcker
Prof. Dr. rer. nat. Bernhard Wolf**



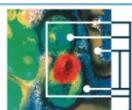
Heinz Nixdorf - Lehrstuhl für Medizinische Elektronik (Prof. Wolf)

Gliederung

- Motivation
- Grundlagen
 - Sensoren
 - Filter
 - Regelung
- Umsetzung
- Ausblick

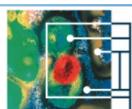


Motivation und Aufgaben

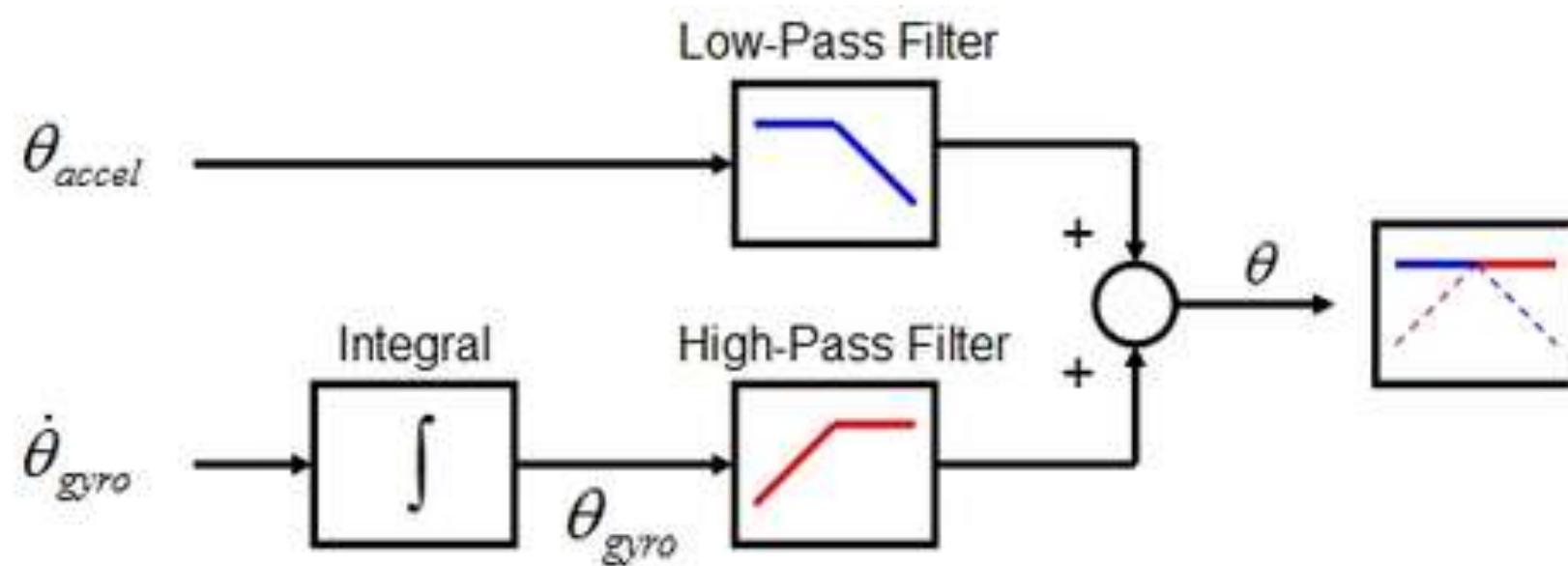


Sensoren

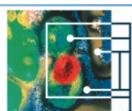
- Gyro Sensor
 - Winkelgeschwindigkeit
 - Initialisierung
- ACC Sensor
 - Beschleunigung (3-Achsen)
 - Umrechnung

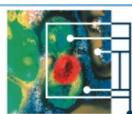
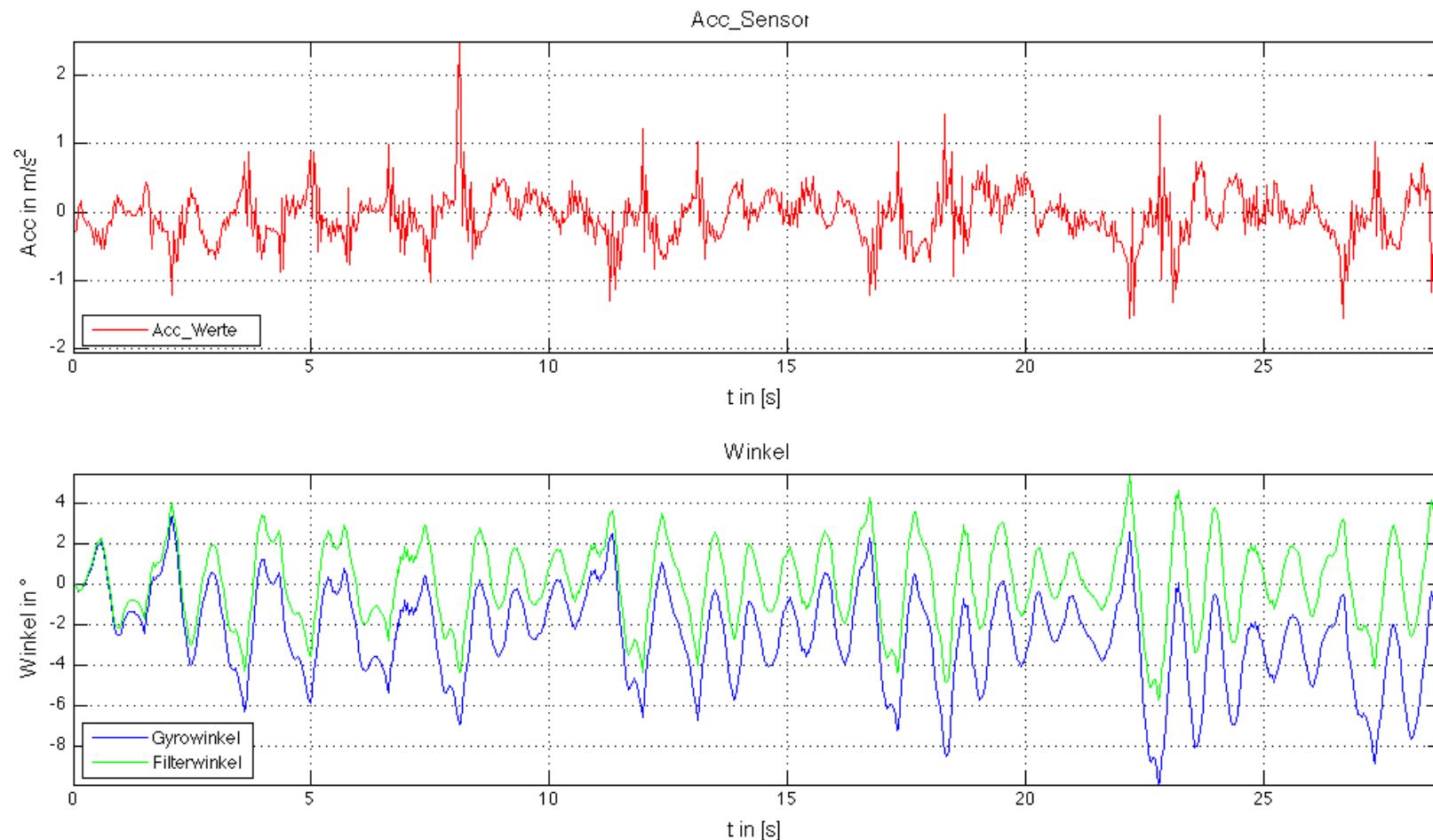


Filter



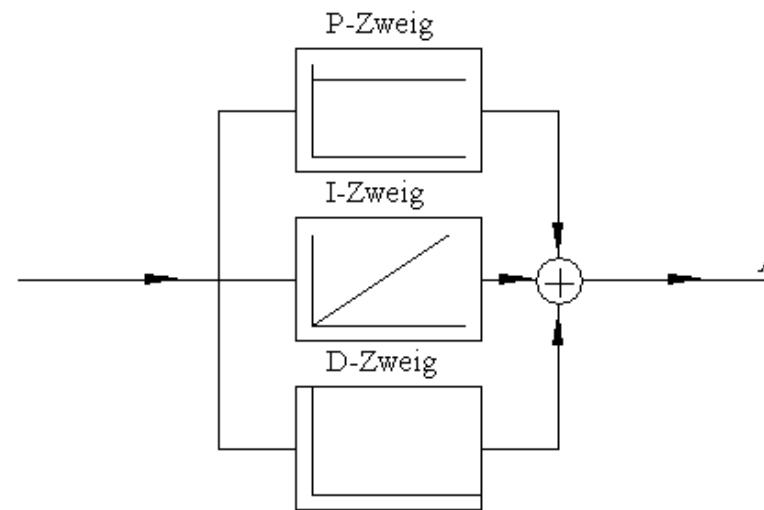
$$\theta_{n+1} = (0,98 \times \theta_n) + (0,02 \times \theta_{ACC})$$



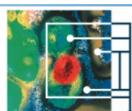


Regelung

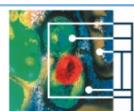
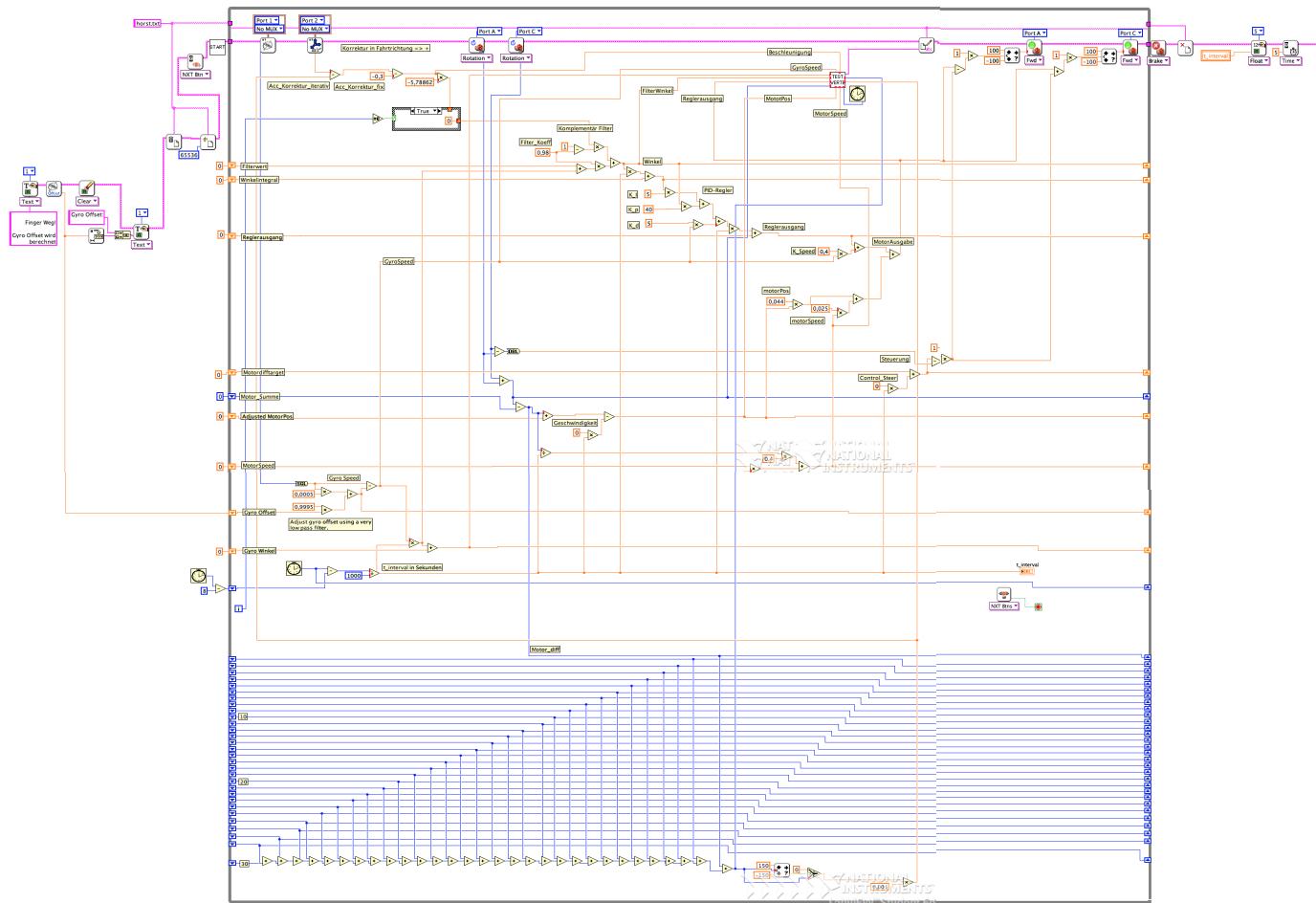
- PID Regler
 - Funktion
 - Auslegung
 - Herausforderung



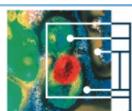
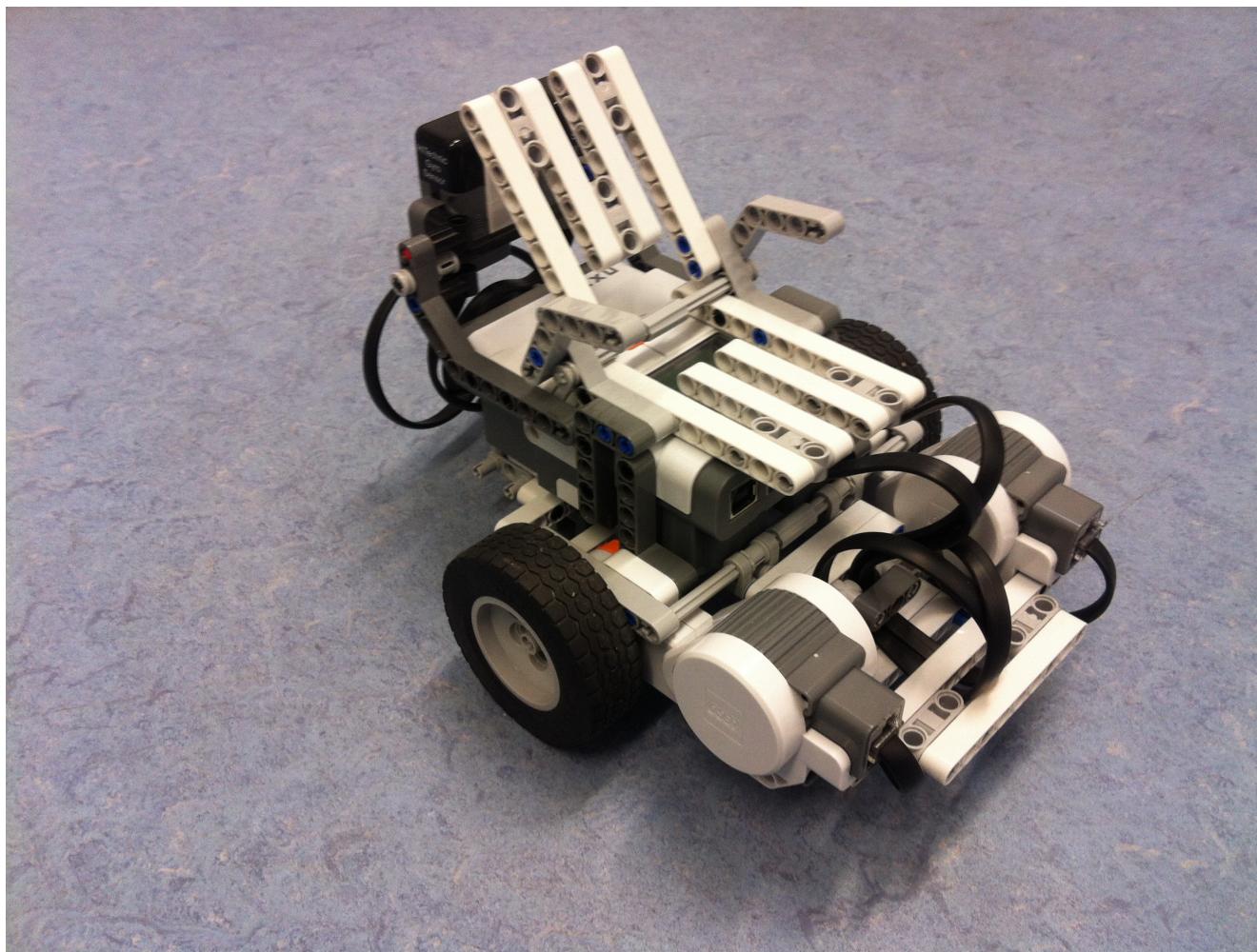
$$u(t) = K_P \left[e(t) + \frac{1}{T_N} \int_0^t e(\tau) d\tau + T_V \frac{d}{dt} e(t) \right]$$



Umsetzung (gesamtes) Programm

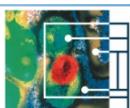


Aufbau und Funktion



Ausblick

- Weitere Entwicklungsmöglichkeiten am Lego-Modell:
 - Implementierung eines Kalmann-Filters
 - Umsetzung der Schwerpunktkorrektur
 - Implementierung der Fensterung mittels Handy und/oder Computer/Laptop
 - Testen verschiedener Topologien



**Vielen Dank
für Ihre Aufmerksamkeit!**

