Training Day 1

Date: Tuesday, 3. (German) *or* 10. (English) September 2024

Aim of the day: Successfully perform the commissioning of a standard axis

Instructors: Yannik Zemp, Filippo Marinho

Participants (8): …

Material:

- Motors, drives, and power supplies from Triamec

Preparation:

- The participants bring their own laptops
- Current TAM Software installed

MORNING

Start: 08:30

Aim: Get to know the hardware and software, commissioning and control theory

Product overview (HW) ~30min

- Types of drives, Option Modules
- Interfaces of the Drive
    - Encoder
    - Motor
    - STO (Safety-Functions)
    - DigIO
    - USB
    - Ethernet (Bridge-Mode)
    - Trialink/EtherCAT
    - Logic Supply
    - Option Modules
- Power Supply
    - Funktion TP (TPDC)
    - Supply via transformer or switch-mode power supply
- Field Busses
    - EtherCAT
        - EtherCAT Master
    - Trialink
        - TL Triamec PCI-Express Adapter Card
- Shielding / Grounding

TAM System Explorer ~1h

- Documentation
- Establish connection (Preferences?)
- Triamec Workspace
- How to use TAM System Explorer
    - Stations (Device Information)
    - Register Tree (Topology)
        - (Information)
        - Parameters: Prepare/Commit/Revert Parameters
        - Commands
        - Signals: Scope
    - Axis Monitor
        - Emergency Stop & Stop (Halt), Global Keys
        - Override
        - VM State
        - Errors / Warnings
    - Scope 1 - basic introduction
        - Pan/Zoom
        - Sampling Time
        - Zoom/Pan
        - Repeat/Single Mode
        - Run Stop
        - Analysis
        - Save/Load Data
        - Templates
    - Tab Panel
- Tam Configuration
    - Save/Load Configuration
    - Persistence on the Drive
    - Open in Editor / Compare with Diff-Tool
    - Simulated Mode
- Modules
    - Add / Remove
    - Plug-in concept
    - Structure and content of Axis Group Module
    - Frequency response tool
- Firmware Update (Official Source Website)
- Debug opportunities
    - Report
    - Browser
    - Logs: Severity Settings, TSE Log
    - Dump files

COFFEE BREAK

10min

Theory ~30min

- Control structure
- Commutation variants and Iq/Id system

Basics of Commissioning ~1h

- How to configure the parameters?
- Go through relevant parameters and explain with a concrete example (AKM22E).
- Motor
  - Thermal Protection
    - Temperature Sensors
    - I2T
- Path Planner
  - Relevance of parameters
- Position Controller
  - Feed Forward
  - Output Limit
  - Encoder
    - Topology (Option Module)
    - Supported Encoder types
    - Remark about the power supply of Magnescale encoders
  - Controller -> Bode
    - Why two control systems?
- Commutation
  - Phasing
  - Differences between encoder types
- Current Controller
- Homing
  - Routies
  - Differences between encoder types

LUNCH 12:15

AFTERNOON

Start: 13:30

Aim: Hands-on experience with commissioning and tuning of an axis

Commissioning and Tuning with practical exercise ~2h

- Overview Commissioning
- Frequency Response Measurement

- - Exercise
- Tuning with Bode and Nyquist Plots
    - Exercise
- Feed Forward
- Tests in Time and Frequency domain
    - Exercise

COFFEE BREAK

10min

Measurements, Scope 2 ~1h

- Trigger
- Axes
- Auto Save
- Streaming
- Data Analysis, FFT, STD

Conclusion of the day ~15min

- Summary
- Outlook

End: ~ 17:00