

Reference Projects

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designXtronics Roman Frank Starbek

PHILOSOPHY

SMART – create products that are characterized by a high intelligence content

SIMPLE – just implement what's needed, not what's possible

SWIFT – success projects with a great amount of experience

PERSONAL DATA

Birthdate: 28.04.1971
Place of birth: Leverkusen
Nationality: german
Marital status: married

CONTACT

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PROJECTS (Extraction)

- 2021 – 2022 Functional Safety Software for Electronic Torque Manager (ETM®) – GKN Driveline International GmbH**
Period: 13 months
Content: Concept Development & Evaluation of model-based algorithms for Safety Torque Monitoring; Consulting and Support for Development of Functional Safety Software (ISO 26262, ASIL-B); Automotive SPICE®-conform development along Software Engineering Process Group (SWE); Ensuring quality maturity levels in corresponding development stages
Tools: MATLAB/Simulink/Stateflow, dSPACE TargetLink, PTC Integrity Lifecycle Manager
- 2019 – 2020 Plant modeling & model-based control design – Edscha Engineering GmbH (Remscheid)**
Period: 6 months
Content: Derivation of physical equivalent model of an electric drive system containing components electric motor, transmission, coupling, load and non-linearities (e.g. friction, mechanical bound and kinematics); implementation of the complete drive system model, analysis and testing of dynamics; introduction of a cascaded control concept; model-based design of controllers and realization of a MATLAB® GUI for rapid control design and automatized linear and non-linear analysis with corresponding plot figures for characteristics of system dynamics
Tools: MATLAB/Simulink/Stateflow, GIT
- 2019 – 2020 Chassis Control Coordinator for autonomous driving – (Salt & Pepper Technology GmbH & Co. KG)**
Period: 15 months
Content: Consulting and coordination of tasks within the Salt & Pepper team; development of a MATLAB® user interface "Track Generator" for the interactive definition and kinematic analysis of reference trajectories for autonomous driving; consulting on development of a Simulink® functional architecture for series longitudinal controller; development of longitudinal control (library) functions for various requirements for position, velocity and acceleration controls; implementation of smooth switching mechanisms between several longitudinal controllers taking into account various situations (driving, stopping, standstill, starting, etc.); development of filter algorithms for reference values dependent on several constraints; development of Simulink® library blocks and a comprehensive MATLAB® GUI for definition and execution of automated unit tests
Tools: MATLAB/Simulink/Stateflow, GIT, Jira, Doors
- 2015 – 2018 Rapid Control Prototyping test bench for model-based design of control algorithms for refrigerant circuits of heat pumps – Vaillant (Remscheid)**
Period: 24 months
Content: Commercial and technical head of overall test bench development: support with documentation of the specifications (requirements, components, interfaces, etc.), selection and research of actuators, sensors, power amplifiers and real-time system; development and implementation of powerful and generic software architecture and control software, extensive initial commissioning and Rapid Control Prototyping of modern complex algorithms for refrigerant circuit control
Tools: MATLAB/Simulink/Stateflow, dSPACE MicroLabBox and ControlDesk
- 2014 – 2015 Model-based control of a Hardware-in-the-loop test bench for actuators of electric steering systems – Ford (Cologne)**
Period: 8 months
Content: Analysis of existing test bench control software, modeling of a steering system with actuators, integration of the steering system into a vehicle simulation model (ASM) for real-time implementation on the Hardware-in-the-loop (HIL) test bench; modeling of the HIL components (load motor, clutch, steering drive motor) and simulation of the overall test bench; concept development for an algorithm for active vibration damping, simulation of the concept, implementation and commissioning on the test bench
Tools: MATLAB/Simulink/Stateflow, dSPACE DS1006
- 2013 – 2014 Development of a test bench for analysis of efficiency of EPB spindles – TRW (Koblenz)**
Period: 24 months
Content: Commercial and technical project management for overall test bench development: support with documentation of the specification, dimensioning of components and CAD construction; implementation of a simulation study and derivation of requirements for selection and research of actuators, sensors, power amplifiers and real-time system; development of control approach and generic software architecture; construction, commissioning and approval of the test bench
Tools: CATIA, MATLAB/Simulink/Stateflow, dSPACE ControlDesk und DS1006
- 2012 – 2013 Development of a Hardware-in-the-Loop test bench for actuators of electric steering systems – Gigatronik (Cologne)**
Period: 8 months
Content: Commercial and technical project management for the overall test bench development: support with documentation of the specifications, dimensioning of components and CAD construction; selection and research of actuators, sensors, power amplifiers and real-time system; model-based control design (modeling of steering system, extensive linear analysis and functional testing)
Tools: MATLAB/Simulink/Stateflow, dSPACE ControlDesk und DS1006



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PROJECTS (extract)

- 2011 – 2012 Model-based control of a magneto-rheological absorber to limit the spinal force of vehicle occupants –** Gigatronik (Stuttgart)/Inventus (Austria)
Period: 6 months
Content: Modeling and implementation of a magneto-rheological absorber system as well as linear and non-linear analysis of system dynamics; design and implementation of a controller with a non-linear observer (Kalman) to estimate the spinal force; offline simulation of the closed control loop for analysis of the absorber and derivation of the requirements for absorber, control unit and interfaces; real-time implementation and application
Tools: MATLAB/Simulink/ Stateflow, GIGABOX pro and dSPACE MicroAutoBox
- 2011 Control software for a keyless entry and start system –** Delphi (Wuppertal)
Period: 9 months
Content: Specification of an event-based keyless system functionality with regard to modularity, AUTOSAR conformity and production C code generation; specification with customer and implementation of all keyless functions; development of Simulink environment for offline simulation and analysis of the overall algorithm; extension of the keyless development environment by a complex MATLAB user interface for visualization of locking functions and antenna search rooms/areas for reproducible function tests within offline simulation
Tools: MATLAB/Simulink/Stateflow
- 2010 Development and implementation of control algorithms for brushless DC motors –** Pierburg (Neuss)
Period: 4 months
Content: Physical modeling of a rotating drive unit, model-based design of a cascade controller (current, speed, position); development of an algorithm for commutation and field-oriented current control of a motor prototype
Tools: MATLAB/Simulink
- 2009 – 2010 Real-time Blockset for the rapid prototyping system "GIGABOX pro" –** Gigatronik (Cologne)
Period: 8 months
Content: Specification of Simulink interface blocks and configuration for GIGABOX pro interfaces (AD-Converter/DA-Converter, digital I/O, PWM output, CAN, RS232, etc.); realization of a block library with a powerful generic API functionality; testing and commissioning of all interfaces under real-time conditions; specification and implementation of extensive online help for the **Real-Time Blockset**
Tools: MATLAB/Simulink/Real-Time Workshop
- 2008 Model-based control and diagnosis for active toe angle and camber angle adjustment –** BMW (Munich)
Period: 4 months
Content: Supervision and coordination of the prototypical development of a real-time capable Simulink algorithm for the implementation of an active toe angle and camber angle adjustment on the rear axle of a vehicle; analysis of potentials for vehicle dynamics control; development of a prototypical model-based diagnosis
Tools: MATLAB/Simulink/Stateflow, dSPACE MicroAutoBox
- 2006 – 2007 Observer-based current control for a magnetic actuator –** Siemens VDO (Schwalbach)
Period: 16 months
Content: Physical modeling of a magnetic actuator; development of a non-linear parameter observer; design and implementation of a model-based classic current control based on observer output
Tools: MATLAB/Simulink/Stateflow, dSPACE ControlDesk and DS1005
- 2004 – 2005 Environment for the development and implementation of driver assistance functions using the example of a model car –** Gigatronik (Stuttgart)
Period: 10 months
Content: Thesis supervision: setup of a model car (1:12), which is located on a flat track unit and is equipped with sensors for distance detection, and the associated hardware and software; design and implementation of a gain-scheduled H-Infinity controller for position control of the model car
Tools: MATLAB/Simulink/Stateflow, dSPACE ControlDesk and DS1005
- 2004 Optimal state-space controller for electro-mechanical power steering –** BMW (Munich)
Period: 8 months
Content: Physical modeling of the steering system; development of an environment for the rapid automated design of a Linear Quadratic Gauss (LQG) controller for zero torque control of an electro-mechanical power steering system; real-time implementation and coordination of the controller in the test vehicle
Tools: MATLAB/Simulink, dSPACE ControlDesk and MicroAutoBox



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PROJECTS (extract)

- 2004 Modeling of a vehicle on a roller test bench for a diagnostic tester** – Daimler (Sindelfingen)
Period: 6 months
Content: Physical modeling of a vehicle drive train including tires on a controlled roller test bench; generation of the model C code and implementation on a real-time capable PC as a simulation and test environment for a diagnostic tester
Tools: MATLAB/Simulink/Stateflow, dSPACE TargetLink and dSPACE ControlDesk and DS1005
- 2003 – 2004 SIL-Simulation of a cruise control algorithm** – Daimler (Untertürkheim)
Period: 3 months
Content: Programming of a powerful MATLAB graphical user interface for the interactive and reproducible Software-in-the-Loop (SIL) test of a cruise control algorithm for commercial vehicles in offline simulation with logging and analysis functionalities
Tools: MATLAB/Simulink
- 2003 - 2004 Modeling and simulation of a two-track vehicle model** – Gigatronik (Stuttgart)
Period: 18 months
Content: Development, implementation and real-time test of a generic two-track vehicle model for use in vehicle dynamics applications in offline and online (real-time) simulation
Tools: MATLAB/Simulink/Stateflow, dSPACE DS1005 and AutoBox
- 2003 - 2004 Active vehicle fixing control and driving resistance simulation** – Daimler (Sindelfingen)
Period: 12 months
Content: Model-based development, implementation and commissioning of a cascade control for a position-controlled fixing functionality via active air springs to fix a vehicle on a driving dynamics test bench; development, implementation and commissioning of an algorithm for simulating driving resistance for the driving dynamics test bench
Tools: MATLAB/Simulink/Stateflow, dSPACE-ControlDesk and DS1005
- 2003 Drive train model with automatic transmission and Tiptronic** – Daimler (Sindelfingen)
Period: 3 months
Content: Physical modeling of a vehicle drive train with automatic transmission and tiptronic functionality for an FMU (Functional Mockup Unit); generation and implementation of the C code on a real-time capable PC
Tools: MATLAB/Simulink/Stateflow, dSPACE TargetLink
- 2002 – 2003 Model-based control algorithm for reversible belt retractors** – TRW (Alfdorf)
Period: 6 months
Content: Development of a model-based triggering algorithm for a reversible belt retractor; generation of the production code and commissioning as well as coordination of the prototype in the test vehicle
Tools: MATLAB/Simulink, dSPACE TargetLink, GT-uniECU
- 2002– 2003 Control of an exhaust gas recirculation valve** – Gigatronik (Stuttgart)
Period: 6 months
Content: Physical modeling of an exhaust gas recirculation valve as well as development, implementation and commissioning of various control approaches (PI, PID, LQG, H-inf, ...) for training purposes
Tools: MATLAB/Simulink, dSPACE ControlDesk, DS1005 and Autobox
- 2001 – 2002 Development of electrical steering systems** – Mercedes-Benz Lenkungen (Esslingen)
Period: 14 months
Content: Requirements management for electrical steering systems; physical modeling of various electrical steering systems (EPAS, superimposed steering); specification of requirements for mechanical engineers; model-based development of various modern control approaches (LOQ); production code generation for fixed-point arithmetic; implementation on prototyping hardware and validation in the test vehicle and in driving tests; development of an environment for automatic identification of linear and non-linear electric motor parameters
Tools: MATLAB/Simulink, dSPACE ControlDesk and Autobox
- 1999 – 2001 Development of scaling tools for fixed-point production code generation with TargetLink** – dSPACE GmbH (Paderborn)
Period: 20 months
Content: Specification of methods and tools for scaling variables of dynamic (state-space) systems in fixed-point arithmetic for automatic production code generation; programming of API functions and user interfaces for scaling, analysis and visualization of time responses of dynamic systems
Tools: MATLAB/Simulink, dSPACE TargetLink

