Samet Efekan DOSKAYA

Mechatronics & Control Systems Design Engineer

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LinkedIn Profile

Mechatronics Engineer with a strong foundation in control theory, simulation-driven design, and real-time embedded systems for defense-grade electro-optical stabilization and target tracking platforms. Experienced in system identification, digital filtering, and real-time control implementation ensuring high precision and smooth operation. Hands-on experience implementing real-time control software for actuator-driven systems. Multidisciplinary background enables effective integration of control algorithms, embedded software, sensors, actuators, and testing workflows to deliver robust and reproducible control solutions. Comfortable collaborating across hardware and software teams to deliver robust, reproducible control solutions for aerospace and defense applications.

Experience

•Mechatronics & Control Systems Design Engineer ASELSAN | Jan 2024 - Present

– **Control Systems Engineering**

∗ Developed and implemented **high-performance real-time control** algorithms (PID, state-space, adaptive, model-based) for gimbal stabilization and target tracking applications (ASELFLIR-600 Electro-Optical System), ensuring **high precision** and **smooth operation under dynamic environment**.

∗ Performed swept-sine system identification; created mathematical models and simulations for stabilized electro-optical systems (ASELFLIR-400 and ASELFLIR-410 Electro-Optical System) by modeling, filtering, sensing and actuation in MATLAB/Simulink to predict **performance**, **stability margins**, and **robustness**.

∗ Led integration and field validation of electro-optical stabilization systems (ASELFLIR-400 and ASELFLIR-410 platforms) across multiple **ground** and **airborne** vehicle integrations, gaining hands-on field experience in system bring-up, calibration, and **real-world performance validation** under diverse operating conditions.

∗ Analyzed closed-loop performance in the frequency domain to assess sensitivity, bandwidth, and robustness trade-offs, for **gimbal stabilization**, ensuring stable and predictable behavior under sensor noise, actuator limitations, and external disturbances.

∗ Collaborated with embedded software and hardware teams to integrate control algorithms with sensors (IMUs, gyroscopes, encoders) and actuators, ensuring consistent **real-time** behavior across simulation, prototyping, and deployed systems.

– **Embedded & Real-Time Systems**

∗ Developed and integrated motor control firmware on TI C2000 DSPs, including **field-oriented control (FOC)** of a PMSM with shunt-based current loops, PWM generation, MOSFET switching behavior, and filtering considerations affecting control bandwidth and noise sensitivity.

∗ Implemented interrupt-driven control execution with **50 µs control-loop periods**, ensuring deterministic timing and reliable real-time realization of motor control algorithms.

∗ Integrated sensors and peripheral interfaces using UART, SPI, ADC, and I2C, evaluating communication latency and throughput trade-offs to ensure data availability compatible with control-loop bandwidth requirements.

– **Test and Validation**

∗ Used oscilloscopes and logic analyzers for signal-level validation of firmware-peripheral synchronization during hardware integration.

∗ Built automated signal generation and validation framework for Stewart hexapod testing systems by using MATLAB to simulate the platform behaviors for electro-optical systems, including profile similarity analysis and report generation, ensuring accelerated testing environment.

•Candidate Engineer TUSAS | Nov 2022 - May 2023

Designed and implemented a discrete-time PID controller for DC motor control in C++, ensuring stable and accurate closed-loop system performance through simulation-based analysis.

TECHNICAL SKILLS

Control Systems: PID Control| State-Space | Model-Based Control | Frequency-Domain Analysis and Tuning
Modeling and Simulation: MATLAB | Simulink | Dynamic System Modeling
Sensors and Feedback Systems: IMUs | Gyroscopes | Accelerometers | Encoders
Motor and Actuator Control: BDC | BLDC | PMSM (FOC) | RVC | Servo Motors
Embedded and Real-Time Systems: Bare-Metal Programming | TI C2000 (TMS320F28379D/388D) | Real-Time Interrupt-Driven Systems | Hardware-Level Debugging (JTAG, In-Circuit Emulators)

Programming Languages: C | C++ | Python
Software and Development Tools: MATLAB | Simulink | Code Composer Studio (CCS) | Visual Studio | Git | DOCKER | SVN | Jira | Confluence | Claude Code | LaTeX | DOORS | SAP

Education

•B.Sc. in Mechatronics Engineering **Cankaya University , Turkey | Oct 2018 - Jun 2023**

Full Scholarship | GPA: 3.40 / 4.00 | Top-Ranked Graduate