Mads Egekvist

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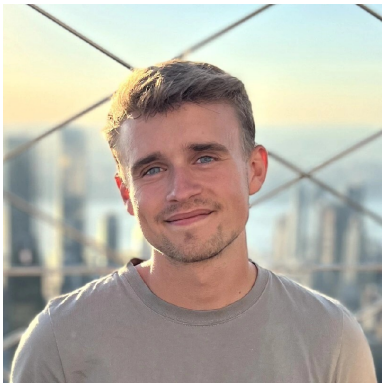

Education

2021 - 2024 | **Electro-Mechanical System Design (EMSD)**
Mechanical Engineering, Aalborg University

Modules include: Control of Fluid Power and Electrical Servomechanisms, Micro Processors and C Programming, Finite Element Methods, Engineering Optimisation, Multi Variable Control, AC Motor Drives, System Identification, Nonlinear Control, Lagrangian Mechanics

2018 - 2021 | **Maskin og Produktion**
Mechanical Engineering, Aalborg University

Modules include: Statics and Dynamics, Classical Mechanics and Thermodynamics, Numerical Methods, Solid Mechanics, Actuation and Robotics, Linear Control, Statistical Methods, Plastic and Fiber Composites

Relevant Experience

Aug 2024- | **Software and Control Engineer, Teejet Technologies**
Designing and implementing cascaded MIMO nonlinear control systems for agricultural machinery. Developing sensor fusion algorithms using IMU. Working with C++ and object-oriented programming for embedded systems, and using MATLAB/Simulink/Simscape for modeling, simulation, and control algorithm development.

Aug 2021- Oct 2023 | **Mathematics Teacher, Aalborg University**
Conducted the Brush-Up Math AAU course for incoming freshmen, teaching high-school level mathematics to refresh their knowledge. Presented to groups of 60-80 students, provided individual classroom support, and strengthened my expertise in basic mathematics. Developed valuable skills in public speaking, and effectively explaining complex concepts at an accessible level.

Jun 2022- Jun 2024 | **Engineer, FunCenter**
Developed and implemented electrical solutions for escape rooms, working with 5V, 12V, and 230V systems. Maintained and repaired laser game equipment and established electrical circuits, often using Arduino and C code to create and fix simple electrical circuits and actuators. Enhanced problem-solving skills and gained hands-on experience with practical electrical engineering applications.

Sep 2021- Jun 2022 | **Engineer, SiteTech**
Developed automated grout removal system using a frame with three stepper motors to control a drill, mimicking 3D printer mechanics. Implemented control algorithms for precise drill positioning and devised path planning strategies for DC motors to move the frame in X and Y directions, optimizing motor movements to adjust wire length and achieve accurate frame positioning. Enhanced skills in motor control, automation, and path planning in an innovative engineering startup environment.

Skills

Programming Languages	MATLAB, C++, C, Python
Software and Tools	Simulink, Ansys, LabVIEW, SolidWorks
Technical Proficiencies	Electric Circuit Design, Hydraulic Diagram Design, Controller Design, Filter Design, Mechanical Systems Drawing, Finite Element Analysis

Recent Projects

Master Thesis	**Efficiency Optimization using Full-Bridge Oscillation Transformer (FBoT) Control in an Electric Mini Loader** Developed and tested a nonlinear control system for MISO ON/OFF valves in a Full-Bridge Oscillation Transformer (FBoT) to improve efficiency in an electric mini loader, replacing traditional proportional valves. Employed a Kalman Filter for state estimation and for tracking slow-varying system parameters, contributing to better state estimation and increased performance.
8th Semester Project	**Energy Recovery System for a Universal Robot UR5** Developed an energy recovery system using supercapacitors instead of braking resistors for a UR5 robotic arm, designing and implementing a buck-boost converter to store and reuse braking energy, improving the robot's energy efficiency.
7th Semester Project	**Motion Control of a Fluid Power Cylinder Drive** Developed a motion control system for a fluid power cylinder drive, utilizing linear control theory and system modeling to enhance hydraulic system performance, and evaluated the use of glycerol as a sustainable alternative to hydraulic oil.
Bachelor Project	**Automatic Search & Rescue Drone** Developed an automatic drone swarm system to enhance water-related SAR operations by providing rapid, efficient, and cost-effective search capabilities using thermal and optical cameras, and implemented a robust control system for autonomous navigation and target detection.