Brian Burrous

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Education

University of California Los Angeles (UCLA)

Bachelors of Science in Mechanical Engineering: 3.3 GPA June 2023

Coursework in: Kinematics, Dynamics, and Control of Robotics, Control System Design, Algorithm Design, Statistical Thermodynamics

Experience

ASME X1 Robotics (UCLA Robotics Club) Los Angeles, CA

CS Lead *2021-2023*

Boelt (Robot Dog)

- Lead 8 person team building software systems for *Boelt*, a quadruped robot dog.
- Solved Inverse Kinematic Equations, wrote controls code to generate task space trajectories for multiple gait strategies, used manipulability ellipsoid to prevent singularities, determined actuator requirements using inverse dynamics

Selected Projects

IK_Solver.jl: Julia library to solve robot inverse kinematics.

Methane Pyrolysis:

- Designed and ran thermodynamic analysis on system converting methane (potent greenhouse gas) to hydrogen gas (clean fuel) and graphite (important lithium ion battery material).
- Attained theoretical yields of 1kg of hydrogen and 3kg of graphite per day (70% conversion rate) by using solar concentrator.

Hospital Helper Robot:

- 4 DOF robot arm enabling hospital patients with limited mobility to feed themselves, giving back autonomy and dignity.
- Modeled robot in SOLIDWORKS and ran design study using FEA to optimize part geometry.
- Applied an algebraic approach to solve Forward and Inverse Kinematics for novel 4R manipulator and developed simulation in Matlab.

Prosthetic Hand — Senior Capstone Project:

- Designed low cost, fully 3D printed partial prosthesis for Drew, a UCLA student with Poland's Syndrome.
- Implemented force control scheme using force sensitive resistors

Activities

AI and Robotics Ethics Society Los Angeles, CA

External Vice President *2022-2023*

- Co-Founded UCLA chapter of the AI and Robotics Ethics Society (AIRES), club focused on mission of ensuring AI is created ethically and responsibly. Spearheaded newsletter initiative to kept UCLA community up to date with latest artificial intelligence breakthroughs.

Skills

CAD and FEA: SOLIDWORKS, Onshape, Autodesk Inventor, and Fusion 360

Manufacturing: Certified Manual Machinist, experienced with manual mill, lathe, CNC machining and CAM. Knowledge of GDT principles and DFM. Experience with CNC machining and CAM.

Programming: Matlab, Python, Julia, C++

Control Theory: Experience with using Root Locus Methods, Loop Shaping Methods, Robust Control, MATLAB implementation of PID, LQR LQG controllers, stablity of discrete and continuous systems, use of DSPs for system identification and control law testing using Simulink