CAPPRIN BASS

Roboticist, Boston, MA
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EDUCATION

Oregon State University - Corvallis, Oregon Sept. 2020 - July 2022
M.S. Robotics
Thesis: Geometric Optimization Methods for Mobile Systems 3.78 GPA

Colorado School of Mines - Golden, Colorado Aug. 2016 - May 2020
B.S. Computational and Applied Mathematics 3.54 GPA
Biomechanical Engineering Minor

WORK EXPERIENCE

Boston Dynamics AI Institute October 2023 - Present
Roboticist

- Research and development on generational robotics problems
- Geometric mechanics for visulization, modeling and control of robot manipulators

MITRE Labs December 2022 - September 2023
Robotics and Autonomous Systems Engineer

- Research and on-hardware implementation of control barrier functions for safety-critical autonomy
- Designed optimal control with respect to constraints on safety, actuators, dynamics, and mission
- Support for the DoD TRMC Testing & Evaluation program in Autonomy and Artificial Intelligence

Laboratory for Robotics and Applied Mechanics October 2020 - July 2022
Graduate Research Assistant

- Applied geometric mechanics as a generalized framework for modeling of robot locomotion
- Used differential geometry to map dynamics between robot shape, position, and other spaces of interest
- Abstract-algebraic formulation makes methods invariant to coordinate choice or parametrization

PROJECTS

3D Rotational Coordinate Optimization

- Derived and programmed finite-element optimization of rotational frame for kinematic, drag-dominated, and inertia-dominated mobile robot systems, using robot dynamics as an objective function
- Chosen frame minimizes perturbation of orientation under changes in robot configuration

Optimally Constrained Shape Space Manifold

- Generated lower-dimensional choice of robot shape space by joining optimal closed motion plans

TECHNICAL STRENGTHS

Languages	MATLAB, Python, C++, R, Java, SQL, PhP, JavaScript, Node, Bash
Mathematics	Abstract Algebra, Differential Geometry, Finite Element Analysis, Optimization, Multivariate Analysis, Stochastic Models, Statistical Analysis
Mechanics	Lagrangian and Newtonian Mechanics, Optimal Control, Kinematics, Dynamics
Technologies	ROS, OpenCV, PyTorch, TensorFlow, Docker, Kubernetes, boto3, Neo4j