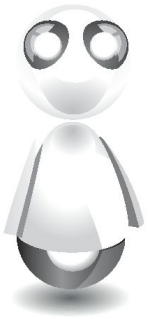
Fall 2015 Student Projects
Autonomous Systems Lab

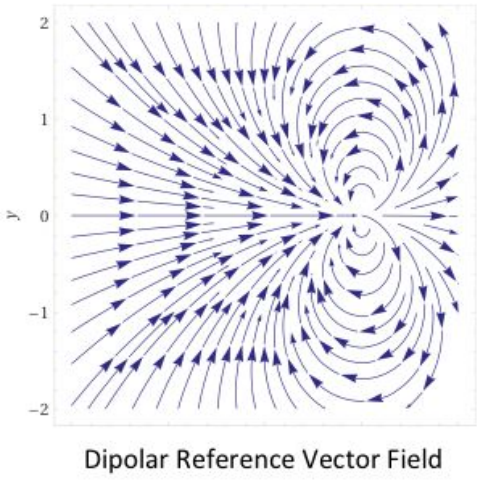


VERIFIABLE
ROBOTICS
RESEARCHGROUP

The Verifiable Robotics Research Group (www.verifiablerobotics.com) is part of Cornell's Autonomous Systems Lab (www.cornell-asl.org) and is lead by Prof. Hadas Kress-Gazit. This Fall, we are looking for one student for each of the three projects below. If you are interested, please apply as follows:

- Send an email with the subject line "[ASL Fall 2015 Project] Your First and Last Name" to the corresponding PhD student (see info after each project)
    - If you are interested in more than one project, please send a single email, but with multiple recipients.
    - In any case, please CC Prof. Kress-Gazit (hadaskg@cornell.edu)
    - In the email, include your résumé, your up-to-date transcript (unofficial is OK), and a short cover letter.
- We will then contact you to set up a short informal interview.

Development and Experimental Comparison of Control Laws for the Navigation of a Segway-based Differential-drive Robot



Dipolar Reference Vector Field

Imagine you have built a robot for delivering homework to your professors. Is it enough for the robot to simply drive up to the professor's door? Ideally, we would like the robot to be facing the door when it arrives there. This can be achieved with a variety of control laws; from simple "turn-and-drive" navigation to nonlinear control laws (e.g. based on reference vector fields or artificial potential functions).

The objective of this project is to evaluate the comparative performance of various control laws in practice. You will research candidate control laws, develop your own, tune them, implement them in Python, and perform experiments on a Segway-based differential-drive robot. This also includes coming up with meaningful performance metrics / criteria against which you will compare the different control laws.

Credits: 3-4

Contact: Spyros Maniatopoulos (sm2296)