**Independent Study Draft**

This independent study will explore two related approaches to motor control: the control basis and dynamic movement primitives (DMPs).

These two approaches each provide a method for generating kinematically referenced movement primitives. The control basis supports sequential composition and value iteration techniques, while the DMP is a parametric dynamic model that is a natural application of a policy iteration techniques.

These two methods are widely used for defining robot motion but they present some fundamental differences. The control basis approach represents behavior using navigation functions that act as attractors that are composed using value iteration to find sequential solutions. DMPs define movement in terms of the superposition of an equilibrium setpoint controller and a policy for combining basis functions for natural, dynamically feasible motions. The parameters for a DMP are set using policy iteration techniques to optimize a single controller that can be applied to multiple instances of the task.

The independent study will focus on comparing and contrasting these approaches as well as on evaluating the potential for a hybrid approach that combines their respective strengths. Readings will be selected from publications on the control basis and DMPs in the robotics literature and implementations will be used to experiment with such systems in a Gazebo simulator of the UMass uBot.

Results of the study will be published as a tech report that will include the bibliography, the results of experimental implementations, and findings regarding the potential for a novel hybrid implementation. In addition, the findings will be presented at a lab meeting of the Laboratory for Perceptual Robotics and Resource-Bound Reasoning Lab.