

# Preparation of Papers for AIAA Technical Journals

Liam Brown<sup>\*</sup> and Jeremy Crowley<sup>†</sup>  
*Stanford University, Stanford, CA, 94305*

**In this paper, we discuss a reinforcement learning strategy for the video game Super Smash Bros Melee.**

## Nomenclature

$\beta$  = basis function for global approximation

$a$  = cylinder diameter

## I. Introduction

**S**UPER Smash Bros Melee presents a state space with complex dynamics that is difficult to model without knowledge of the source code used to build the game.

## II. Problem Statement

It is infeasible to discretize the state space for this game if we wish to develop a learning algorithm that can be executed in a reasonable amount of time with a standard personal computer. To account for this, we must apply a learning algorithm that can generalize from limited experience.

$$Q(s, a) = \Theta_a^T \beta(s) \quad (1)$$

## III. Applications to Super Smash Bros Melee

We define a set of basis functions that span the state space based on what is important to the agent.

---

<sup>\*</sup>Graduate Student, Aeronautics and Astronautics.

<sup>†</sup>Graduate Student, Aeronautics and Astronautics.

#### **A. Basis Functions**

#### **B. Reward Functions**

### **IV. Results**

### **V. Conclusion**

### **Appendix**

An Appendix, if needed, appears **before** research funding information and other acknowledgments.

### **Funding Sources**

We would like to thank mom and dad.

### **Acknowledgments**

We would like to acknowledge libmelee for providing an open source solution to obtaining information about the game while it is being played.