



Mechanical and Aeronautical Engineering Department  
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<http://mae.ucdavis.edu/research/spaceEd/>

## 2007-2008 Monthly Seminar Series on Space Research

18 October, 15 November, 17 January, 21 February, 17 April, 15 May  
3<sup>rd</sup> Thursday 4:00-5:00 pm

# REINFORCEMENT LEARNING FOR AEROSPACE APPLICATIONS

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Date: 15 May 2008 Thursday Time: 4:10-5:00 pm (*Refreshments will be provided at 4:00 p.m.*) Location: 1062 Bainer

### ABSTRACT

Hosted by: *Professor Fidelis Eke*

A wide range of aerospace controls problems involve achieving an optimal solution, e.g. transitioning a spacecraft from one state to another state in minimum time, slewing a flexible body in minimum time, or turning an aircraft in minimum time. General continuous-state optimal control problems have been well studied, and rigorous solution principles and techniques exist (e.g. Hamilton-Jacobi theory, Pontryagin's minimum principle, Bellman's optimality principle). Despite the precedent of rigorous solution techniques, many times given problems can not be solved analytically. Furthermore, even in cases when they can be solved analytically, they depend on full knowledge of the system dynamics. Reinforcement Learning is a machine learning technique that uses repeated trial-and-error learning on an unknown system to achieve a feasible solution to a given problem. In this talk, we apply reinforcement learning to the well known "bang-bang" optimal control problem, and investigate its solution in relation to the true optimal solution.

### *For more information about*

***SpaceED (Space Engineering Research and Graduate Program) or the seminars please contact  
Professor Nesrin Sarigul-Klijn at (530)-752-0682 or [nsarigulklijn@ucdavis.edu](mailto:nsarigulklijn@ucdavis.edu)***

Members of the campus community and visitors from the region are welcome to attend the seminar series.

Sign-in is required at the event. SpaceED seminar will replace MAE297 seminar on 3<sup>rd</sup> Thursdays.

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