

Second Workshop on Computational Issues in Nonlinear Control

Location: Monterey, California

Dates: November, 7-8, 2011

Organizers: Wei Kang, Arthur Krener, William McEneaney

Speakers:

Cesar Aguilar, NPS

Morgan Baldwin, Kirtland AFB

Olivier Bokanowski, U Paris 6&7

Michael Demetriou, WPI

Peter Dower, U Melbourne

Fariba Fahroo, AFOSR

Maurizio Falcone, U Roma

Ben Fitzpatrick, Loyola Marymount

Stephen Gaubert, INRIA

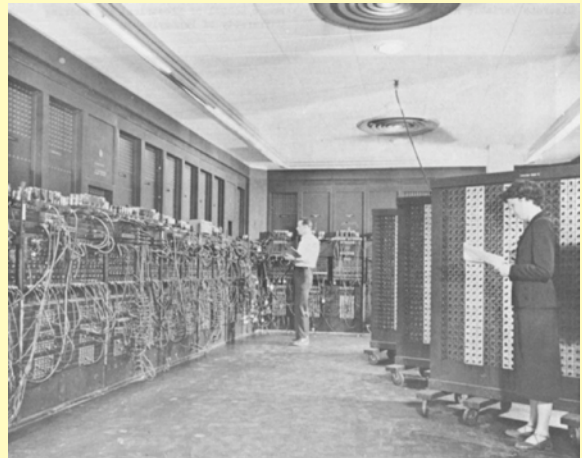
Frank Giraldo, NPS

Qi Gong, UC Santa Cruz

John Hauser, U Colorado

Michael Hintermueller, Humboldt U

Kazufumi Ito, NCSU



More Speakers:

Thomas Hunt, UC Davis

Mark Karpenko, NPS

David Mayne, Imperial College

Kirsten Morris, U Waterloo

Stanley Osher, UCLA

Carmeliza Navasca, Clarkson

Steven Paris, Boeing

Zheng Qu, Ecole Polytechnic

James Rawlings, U Wisconsin

Gary Rosen, USC

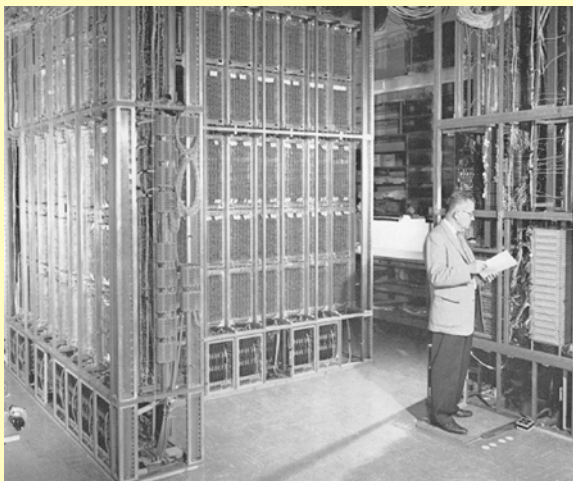
Michael Ross, NPS

Chi-Wang Shu, Brown U

Ralph Smith, NCSU

Alexander Vladimirovsky, Cornell U

Chunming Wang, USC



Support: AFOSR and NSF

Tentative Schedule – Day One

Session 1: *Single-Track Grab-Bag*

8:30 **Fariba Fahroo** Overview

9:00 **Stanley Osher** Numerical Methods for HJ Equations-whats new

9:30 **Maurizio Falcone** Recent results on the approximation of optimal control problems and games

10:00 Coffee

10:30 **Stephane Gaubert** Tropical methods in dynamic programming

11:00 **Steve Paris** Trajectory Optimization Using Implicit Integration of 2nd Order Dynamical Systems and Non-linear Programming

11:30 **I. Michael Ross** On Commutative Operations in Optimal Control

12:00 Break for Lunch

Parallel Sessions:

Session 2: *Trajectory Optimization*

1:30 **Qi Gong** Some Hidden Properties in Pseudospectral Computational Optimal Control

2:00 **John Hauser** Trajectory Optimization with Barrier Functionals

2:30 **Morgan Baldwin** Optimal Deorbit Guidance

3:00 Coffee

3:30 **Kazufumi Ito** Nonsmooth method for Optimal Control Problems

4:00 **Mark Karpenko** Flight Demonstration of Pseudospectral Optimal Control for Shortest-Time Maneuvering

4:30 **Johannes Royset** Optimal Continuous Time and Space Search for Moving Targets Using Consistent Approximations

Session 3: *Max-Plus Methods and Hamilton-Jacobi Equations*

1:30 **Ben Fitzpatrick** Nonlinear Tracking and Max-Plus Control

2:00 **Srinivas Sridharan** Idempotent analysis and reduced dimensionality methods in quantum control and risk-sensitive deception games

2:30 **Qu Zheng** Curse of dimensionality reduction in max-plus based approximation methods: theoretical estimates and improved pruning algorithms

3:00 Coffee

3:30 **Olivier Bokanowski** Hamilton-Jacobi approach for solving state-constrained control problems lacking controllability assumptions, and applications

4:00 **Draguna Vrabie** Approximate Dynamic Programming algorithm to solve online the Hamilton-Jacobi-Bellman equation

4:30 **Yongtao Zhang** Fast sweeping methods based on WENO and DG local solvers

Workshop Dinner: Location/Time TBD

Support: AFOSR and NSF

Tentative Schedule – Day Two

Session 4: *Single-Track Grab-Bag*

- 8:30 **William McEneaney** Idempotent Algebra Based Methods and Solution Complexity
- 9:00 **Chi-Wang Shu** Survey on Numerical Solutions of Hamilton-Jacobi Equations
- 9:30 **Kirsten Morris** Optimal actuator location
- 10:00 Coffee
- 10:30 **Wei Kang** The Consistency of Partial Observability for PDEs
- 11:00 **David Mayne** The Role of Model Predictive Control
- 11:30 **James Rawlings** Suboptimal Model Predictive Control

12:00 Break for Lunch

Parallel Sessions:

Session 5: *Hamilton-Jacobi Equations*

- 1:30 **Francis Giraldo** Issues in Simulating Multi-scale phenomena: a scientific computing and numerical methods perspective
- 2:00 **Fengyan Li** Discontinuous Galerkin Methods for Hamilton-Jacobi Equations
- 2:30 **Cesar Aguilar** High-order numerical solutions to the dynamic programming equations of optimal control
- 3:00 Coffee
- 3:30 **Alexander Vladimirovsky** Algorithmic Challenges in Solving Hamilton-Jacobi Equations
- 4:00 **Carmeliza Navasca** Numerical method for hybrid optimal control
- 4:30 **Thomas Hunt** A higher order patchy method for solving the infinite horizon Hamilton-Jacobi-Bellman equation

Session 6: *Distributed Parameter Systems*

- 1:30 **Michael Hintermueller** Optimal control of elliptic variational inequalities: stationarity and numerical realization
- 2:00 **Michael Demetriou** Estimation of the concentration field generated by a moving gaseous source via mobile sensors: Towards the convergence of Control Theory with CFD
- 2:30 **Peter Dower** A max-plus approach to solving a class of infinite dimensional Riccati equations
- 3:00 Coffee
- 3:30 **Chunming Wang** Strategic Sampling Approach for Implementation of Extended Kalman Filter
- 4:00 **Ralph Smith** Real-Time Optimal Control Designs for Hysteretic Smart Material Systems
- 4:30 **Gary Rosen** On the Computation and Analysis of the Adjoint in Distributed Parameter Optimization

5:00 Break for Dinner