



IEEE

SPARKS

IEEE Daytona Section Newsletter
September 2010



FROM THE HIGH CHAIR

Welcome back! I hope you had a summer to remember. Our next section meeting is September 23, 2010, at the Halifax Yacht Club. Dr. Jing Wang, a professor at Bethune Cookman University, will speak about his NSF grant concerning “Trajectory Generation and Cooperative Control of Mobile Robots With Kinematic Constraints”. This topic should be of interest for robotics competition at SoutheastCon.

Al Jusko and Dr. Jianhua Liu form the nominating committee for officers for 2011. Al and JH have prepared an initial slate, but further nominations are always encouraged. Please see Al. or JH if you would like to be considered.

A few years ago Al Jusko did a cost trade of mailing the monthly Sparks versus emailing or accessing it from our website. Because many people either do not have email addresses or do not share them with the IEEE, the cost numbers dictated we continue to send Sparks by mail to reach all of our members. We also began to link it on the web site and send it by email to members who have addresses on file. We still would like to reduce our mailing costs and encourage all of you to share your email address with the IEEE and/or start one. The IEEE suffix to an email address requires a universal email account such as Yahoo, Hotmail, Gmail, Road Runner or AOL.

Recent news is filled with the unemployment rates both locally and nationally. Electrical and software engineers and recent graduates are not immune from the jobless problem. Many engineering support jobs will disappear from Cape Kennedy

after the last space shuttle is mothballed. The IEEE is concerned about unemployment and will host a seminar on October 23, 2010, in Cocoa. This event is not limited to the Brevard IEEE section. See the details on our website or the Region 3 website.

The IEEE membership statistics support the loss of technical jobs in the US as the IEEE membership has dropped 1.1% from last year in Regions 1-6 (the US) and increased 4.7% from last year outside the US. Largest gains are in the Far East.

I recommend reading an article “How to Make an American Job” by Andy Grove (former CEO of Intel, in Bloomberg Business Week of July 5-11, 2010. Mr. Grove points out the impact of moving jobs offshore and the associated loss of technical skills in the US of related disciplines. His recommendation is to develop financial incentives to keep jobs in the US by levying an extra tax on the product of offshore labor and use these funds to allocate to companies that will scale up US operations. I am not sure if these ideas are in sync with our international trade agreements, but many of us lament being unable to buy goods made in America. Mr. Grove argues all of us in business have a responsibility to maintain the industrial base on which we depend as a society – a society we have taken for granted. Food for thought.

The Small Radio Telescope at the Museum of Arts and Sciences (MOAS) in Daytona continues to be upgraded. Needed repairs were made over the summer and light illumination is in an experimental stage. Dr. Barott indicates it will be used as part

of his college course at ERAU about radio astronomy.

Finally our sympathies go out to the family of one of our IEEE Fellows, Bob Haviland, who passed away this spring. Bob gave several talks to our section over the past few years and will be missed. Roger Grubic

SEPTEMBER PROGRAM

TRAJECTORY GENERATION AND COOPERATIVE CONTROL OF MOBILE ROBOTS WITH KINEMATIC CONSTRAINTS

Complex networked cyber-physical dynamical systems are everywhere in our real life. Examples include small-scale air, water and ground-based autonomous vehicle systems, sensor networks, VLSI circuits, computer network, Internet and so on. Yet complex networked cyber-physical systems pose new challenges because they are extremely dynamic, unreliable and large-scale, and traditional approaches based on centralized control may not be applicable. Recent years have witnessed the extensive development on the cooperative control design of networked systems. In this talk, a near-optimal real time trajectory generation method for mobile robots with kinematic constraints is first presented. Then, after a brief review of the basic idea of designing linear cooperative control, a new reactive cooperative formation control design for a class of dynamical systems with collision avoidance capability will be reported. As design examples, the applications to the cooperative control of nonholonomic chained systems and cooperative control based teleoperation with high latency will be discussed. Simulation results and some elementary experimental results will also be provided.

OUR SPEAKER

Jing Wang received his Ph.D. degree in control theory and control engineering from Central South University, China, in 1997. He was a Postdoctoral Research Fellow at the Institute of Computing Technology, Chinese Academy of Sciences, from 1997 to 1999, and at the National University of Singapore, from 1999 to 2002. From 2002 to 2007, he was with School of Electrical and Computer Science of University of Central Florida as a Research Assistant Professor. Since 2007, he has

been an Assistant Professor in Computer Science and Computer Engineering at Bethune-Cookman University. His main research interests include Robot Control, Cooperative Control of Multi-Robot Systems, Motion Planning, Trajectory Planning, Sensor-based Localization, Navigation and Perception of Mobile Robots, Control of Nonholonomic Systems, Visual Servoing, Distributed Optimization, Distributed Sensor Networks, Nonlinear Control of Energy Systems. Recently, Dr. Wang was awarded an NSF Major Research Instrumentation (MRI) grant. He is a Member of IEEE.

BRAIN TEASER CHALLENGE SOLUTION APRIL 2010 BUTCH SHADWELL

After complaining about the inaccuracies in SiFi movies I asked the following question. "...Today we improve the accuracy of air dropped ordnance, and reduce collateral damage, by using a target designator system. Can anyone tell me how these work?" Nearly all ordnance that comes from the air these days uses intelligence of some kind to direct them to the target. This improves the probability of realizing the desired effect and minimizing collateral damage. Most target designators employ a designator laser beam. These may be projected from a platform in the air, e.g.-spotter or bomber aircraft, or from the surface, e.g.- soldiers with their eyes on the target. This beam is usually not in the visible light range and is modulated in some fashion to make it easier to distinguish from other natural or man made light sources. The ordnance then carries technology that can identify and then guide the device to the source of the reflected, properly modulated, light. But I bet you already knew that.

BRAIN TEASER CHALLENGE SEPTEMBER 2010 BUTCH SHADWELL

Parker Peter was a science nerd. One day his school went for a field trip to a laboratory where they experiment with genetically altered earthworms. As the students were visiting the specimen cases, he discovered that one of the slithering mutants had escaped. Then while he was distracted taking pictures of the lab assistants, the errant annelid managed to sink its fangs (I did say it was a mutant, right) into the unsuspecting Parker. Naturally, Parker experienced only mild side effects as his body was transformed into that

of a superhuman with all of the powers of a very large earth worm. Aside from the ability to asexually reproduce, Wormboy also gained the ability to flatten his body so he could slide under the door to enter a locked room and burrow in the soil. His arch enemy, The Bass Fisherman, discovered that passing an electric current through the ground would force Wormboy to come to the surface and reveal his whereabouts. BF decided to measure the bulk resistivity of the soil with four probes 1 cm apart and got 20 ohms. What is the bulk resistivity of this soil?

Reply to Butch Shadwell at b.shadwell@ieee.org (email), 904-223-4510 (fax), 904-223-4465 (v), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328.

(<http://www.shadtechserv.com>) The names of correct respondents may be mentioned in the solution column.

EDITORS NOTES

The **SPARKS** newsletter is also available on our website. The website address is shown in the Section information box to the right.

Our neighboring Sections in Melbourne and Orlando also sponsor activities and meetings that also may be of interest to our members. We encourage you to visit their websites.

Region 3 website
<http://www.ewh.ieee.org/reg/3/>

Melbourne Section website
www.ieeemelbourne.org

Orlando Section website
www.ieee.org/orlando

FUTURE MEETING DATES

The meeting dates for the fall session are: October 28th and *Tuesday* December 7th.

Chair – Roger Grubic

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The website address for the Daytona Section is:
<http://www.ieee.org/go/daytona>

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2010 SECTION OFFICERS

SEPTEMBER MEETING

Thursday September 23rd at the Halifax River Yacht Club
331 South Beach Street, Daytona Beach, Florida 32114
Just south of the Fire Station at the corner of Beach and Orange

AGENDA

6:30 PM Cocktails

7:00 PM Dinner

8:00 PM Program

OUR SPEAKER – Jing Wang, PhD

TOPIC– Trajectory generation and cooperative control of mobile robots with kinematic constraints

Labor Day BBQ Please call with your menu selection. All entrées are \$18.00 each

BBQ Chicken, Cole Slaw

{Entrees served with,

BBQ Ribs, Cole Slaw

{Vegetable du jour,

Grilled BBQ Shrimp Skewers, Rice Pilaf

{Roll and Butter, Garden Salad,

{Coffee/Tea

A Veggie plate is available upon request for \$10

Please contact the secretary with your dinner selections or for program information. Dinner selection's must be in by Wednesday morning so the club has time to order and prepare

Allan Jusko

Secretary

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IMPORTANT: If you make dinner reservations and are unable to attend, call at least 24 hours prior to the meeting to cancel. The Section is charged for all dinners ordered.
