Wavelengths

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CONTENTS

Fall Conference Keynote to Cover Auto Technology

Dr. Andrew Brown of Delphi will be the keynote speaker at our Fall Section Conference, which will take place on Wednesday, Nov 10, 2004 at 5:00 p.m. The location is the bps Training and Conference Center, 31301 Evergreen Road (near 13 Mile Road), Beverly Hills, MI. He will speak on automotive electronics
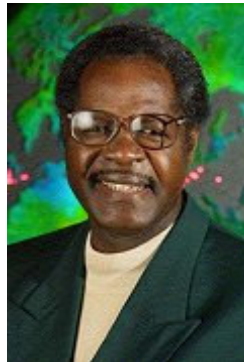
Dr. Andrew Brown, Jr., currently serves as Executive Director of Engineering Competency, DTI/Research Labs, and Product Government Affairs & Partnerships. His position includes responsibility for engineering competency, product leadership & innovation, research labs, and I&CIM. In addition, Andy also serves as President of Delphi Technologies, Inc. and oversees all product regulatory affairs with the EPA and NHTSA in the U.S., the European Commission, and other similar regulatory bodies around the world. He also oversees cooperative R&D partnerships with the U.S. Departments of Commerce, Energy, Transportation, and Defense.

Chapter Presentations
In addition to Dr. Brown's talk, several chapters are sponsoring talks by IEEE distinguished speakers.

Chapter I - Circuits and Systems, Information Theory, and Signal Processing
Title: Efficient Engineering of Hybrid Intelligent Systems for Pattern Recognition

Speaker: Dr. Carla Purdy, Associate Professor, Electrical and Computer Engineering and Computer Science, University of Cincinnati
Abstract: We describe ongoing work in our lab to develop a hybrid intelligent system for pattern classification for sensor data sets. Our prototype version of this intelligent system combines genetic algorithms, neural nets, and fuzzy logic, along with wavelet preprocessing, to correctly classify any of 200+ patterns, with noise levels up to 30%, and with success rates above 90%. The system has been tested on several benchmark sets, including both EKG data and a synthetic data set based on Enose (Electronic nose) data. Our framework is very general, with a rich set of options for customizing the system for specific application needs. The prototype system is implemented in software. We are currently developing modules in VHDL and Verilog to allow flexible implementations, in hardware or software, according to the performance and resource constraints of specific applications. We also describe how to employ the GQM (Goal-Question-Metric) process to efficiently engineer systems such as ours, which rely heavily on heuristic techniques.
Bio: Carla Purdy is Associate Professor of Electrical and Computer Engineering and Computer Science at the University of Cincinnati and a Senior Member of IEEE. She earned Ph.D.'s in mathematics (University of Illinois, Urbana-Champaign) and computer science (Texas A&M University). Her research interests include intelligent systems, systems-on-a-chip, and new circuit technologies. She has published numerous papers in these areas and has graduated 27 Ph.D. and M.S. students. She also directs the Preparing Future Faculty in Engineering

Schedule of Events
5:00 pm - Registration
5:45-6:30 - Chapter Technical Sessions
    7 Technical sessions running concurrently
6:30-7:00 - Student and Vendor Exhibits,
    University Showcases
7:00-7:45 - Dinner
7:45-8:30 - Keynote Address

Location
bps Training and Conference Center
31301 Evergreen Road (near 13 Mile Road)
Beverly Hills, MI 48025

Registration
You can register online at http://www.emcsociety.org/sectionregistration.html or by faxing in the form at http://www.emcsociety.org/SpringRegistrationForm.pdf.

program at the University of Cincinnati and is an active member of Cincinnati's Women in Science and Engineering faculty committee.

Chapter II - Vehicular Technology

Title: New Global Circuit Numbering System
Speaker: Paul Simmons, Supervisor, Ford Motor Co., North American Truck Electrical CAE

Abstract: The New Global Circuit Numbering System (NGCNS) changes the way we do business. It leverages the synergies between the powerful engineering design tools (CAD/CAE) and service diagnostic tools, improving vehicle service and customer satisfaction. NGCNS will provide a clear concise systematic way to identify circuits in vehicle schematics from the Engineer to the Service Technician. NGCNS was developed with input from the Service Technicians, Engineers, and Wire Harness Suppliers from around the world. It defines the circuit number based on the Potential, System, Sub-system and Function (PSF) of the respective portion of the circuit. The color of the wire helps the technician to quickly determine the correct diagnostic voltage by indicating constant voltages (i.e. power and ground) with a color and the function with a second color. NGCNS is being implemented globally throughout the Ford enterprise and will begin to show up at dealers in 2005.

Bio: Paul Simmons is the Supervisor of Ford's North American Truck Electrical CAE team performing computer aided engineering analysis of all electrical/electronic truck systems. The CAE team supports each electrical program management team (PMT) with advance analysis of electrical systems as they are developed. Program architecture is captured in a schematic after which computer aided electrical analysis is performed as design verification assuring robust system development. In addition to 18 years of automotive engineering experience his diverse work experience includes 10 years of automotive restraints sensing systems where he holds 7 patents.   Before coming to Ford, Paul was a Supervisor of Health and Human Services at Macomb Community College. He holds a MSEE and BSEE from Oakland University and a BS in Microbiology/Chemistry Michigan State University. He is active in his community, coaching soccer and teaching martial arts.

Chapter III - Communications and Aerospace Electronics
Chapter IV - Trident

Title: Meta-Materials for Novel Communication Antennas
Speaker:Dr. Hossein Mosallaei, Assistant Research Scientist, The University of Michigan

Abstract: In a sense, every material can be considered as a composite, even if its individual ingredients consist of atoms and molecules. The main objective in defining the permittivity (electric property) and permeability (magnetic property) for a medium is to present the homogeneous view of the material properties of structure. Therefore, it is not surprising if one properly replaces the atoms of the original concept with the structures in a larger scale to achieve a composite medium, called beyond- or Meta-Material, with new material functionality.

Meta-Materials are novel engineered composites of dielectric, magnetic, and metallic ingredients exhibiting superior characteristics that are: a) not observed in the constituent materials; and b) not readily observed in the nature. The objective of emerging area of meta-material is to fill the enormous voids that exist in the currently available design space. The focus in this talk is to present the applications of meta-materials in the design of novel substrates for advanced communication antennas. The challenge is to offer a compact antenna system with remarkably enhanced radiation characteristic. The introduced meta-substrates are constructed utilizing an engineered periodic fashion of dielectric and embedded-circuit structures. Interesting features are obtained by proper tailoring the periodic meta-material configurations. The physical concepts and unique impacts of meta-substrates on the future designs of smart RF/wireless communication antennas are highlighted.

Bio: Hossein Mosallaei is an Assistant Research Scientist in the Department of Electrical Engineering and Computer Science at the University of Michigan. He received his Ph.D. degree in Electrical Engineering from the University of California, Los Angeles (UCLA) in 2001. His research interests include advanced meta-materials for smart RF/wireless microsystems, 3-D micro-electromagnetic front-ends, smart communication antennas, PBG crystals and optical communications, bio-engineering, computational engineering, and optimization methods. Dr. Mosallaei has made pioneer research contributions in the multidisciplinary and emerging area of meta-materials. He has organized several special sessions in IEEE AP-S/URSI conferences. He has been also a plenary session speaker in various national and international symposia. He was evaluated as an IEEE senior member in September 2002. Dr. Mosallaei is the holder of two U.S. patents. He was three times awarded the IEEE AP-S prize for the best student paper in 2000, 2001, and 2003 (with his student); and was the recipient of 2002 Raj Mittra Travel Grant award, and 2001 URSI Young Scientist award.

Chapter V - Computer

Title: Legacy Modernization Case Study
Speaker: John (Jian) Wei, Ciber, Inc., and Alan Byrnes, Blue Cross Blue Shield of Michigan

Abstract: The lack of understanding and complexity inherent in legacy systems have caused several organizations to consider investing in large system modernization endeavors. At the forefront of legacy modernization approaches are the OMG's (Object Management Group), ADM (Architectural Driven Modernization) and MDA (Model Driven Architecture) framework. However, legacy modernization is only a temporary "silver bullet", as every program, component, method etc. qualifies as legacy the minute it goes into production.

BCBSM (Blue Cross and Blue Shield of Michigan) has taken

the perspective that legacy modernization is not only Portfolio Analysis and system cleanup, but involves true Portfolio Management to keep systems well structured and documented.

This presentation will outline the steps that BCBSM and its project strategic partners have taken to execute modernization following OMG standards and utilizing RUP (Rational Unified Process). As well, specific Portfolio Analysis and Portfolio Management tools and methodologies used will be presented in a "lessons learned" fashion.

Bio: Alan Byrnes has worked in the industry for approximately 10 years and have worked at BCBSM for approximately 5 years. He is also an instructor at Lawrence Technological University, where he teaches C++ and Database Management classes. He is currently the technical lead for the Legacy Modernization project at BCBSM.

John Wei obtained MS in Computer Information Systems, University of Detroit Mercy and is at Ciber Inc
John has worked with many projects on development methodologies and technologies in industries ranging from finance to manufacturing. Having worked both on the business and IT sides, John understands the key ingredients in making technology work for an average project engineer. John has published multiple papers and is a frequent speaker at IEEE, SAE, and RUC conferences on topics ranging from Project Management, to Methodology, to Architectural Design.

Chapter VII- Power Engineering and Industrial Applications
Chapter IX - Power and Industrial Electronics
Title: Pricing Electric Power Network Congestion - Financial Transmission Rights
Speaker: Dr, Brian Stott, IEEE Distinguished Lecturer
Abstract: Market restructuring seeks to encourage competitive energy production, and in some cases this has already seen some success. However, existing interconnected transmission systems are normally inadequate to handle the resulting new patterns of flow between generation and load. Transmission congestion is therefore the main limitation on market efficiency, and managing this congestion is of critical importance. In an open access system, the key is congestion pricing. A popular solution is the Locational Marginal pricing (LMP) approach, which tries to penalize users who increase congestion (and perhaps losses) and to reward users who reduce them. However, LMPs are very volatile and they expose market participants to significant congestion-charge risks.

The main topic of this lecture is to describe the ancillary market for Financial Transmission Rights (FTRs) that allows transmission users to hedge (protect) themselves against large swings in congestion prices. In North America, FTR markets are already "big dollar business" in several ISOs (Independent System Operators).

Bio: Brian Stott received his Ph.D. from the University of Manchester (UMIST). He has taught in universities in UK, Turkey, Canada and USA. From 1977 to 1983 he was leader of the real time control group at CEPEL, Rio de Janeiro, developing EMS software for the Brazilian electric power industry. In 1984 he founded PCA Corporation in Phoenix, Arizona, a worldwide supplier of large-scale network analysis and optimization software. He served as its president and eventually chairman until 2000, when the company became a business division of Nexant, Inc. Since then he has been a consultant, working primarily with Nexant.

His career has been devoted to methods and software development for electric power system economy-security analysis and control, including modern markets. One major focus has been security constrained optimal power flow (SCOPF), with multiple applications such as cost and bid-based dispatch, locational marginal pricing, transfer capability evaluation, remedial control action, congestion pricing and hedging, reactive power control and other congestion management issues. Since 1996, he has been heavily involved in algorithms and software for financial transmission rights. He has worked extensively in many other power system network areas, including modeling, sparse matrix solutions, state estimation, advanced fault analysis, and dynamics. He has been a consultant to many companies in the USA and elsewhere, and has given advanced presentations and courses in 25 countries. He is a co-originator of widely used techniques such as the fast decoupled power flow, LP-based economic dispatch and nonlinear SCOPF, Extended Ward equivalents, and the generalized state estimator. He was elected a Fellow of the IEEE in 1983 and is a recipient of the IEEE Millennium Medal.

Chapter VIII - EMC
Title: Radiated Immunity Test Considerations
Speaker: Tom Hahn, Amplifier Research
Abstract: Several contemporary radiated immunity test issues facing today's EMC engineer will be discussed including calibration of microwave pulses, solid state vs. TWT and spot size vs. gain. The problem of harmonics and low gain antennas will also be discussed.
Bio: Tom Hahn is Senior Application Engineer at Amplifier Research. He has 20 years of prior electrical test and applications engineering and management experience at AT&T Bell Laboratories, Lucent Technologies, and Agere Systems. Tom holds a B.S. degree in electrical engineering and physics from Lafayette College.

Chapter X - Engineering Management
Title: Contract Requirements and Engineering Managers
Speaker: Chris Wiggins
Abstract: The primary source of problems with contracts for IT or IT services is that the contracts do not express the requirements. Frequently, lawyers and contract negotiators do not have the knowledge to fill this gap. To prevent problems, users of the IT or IT services should assemble their requirements and have them included in the contract. Some best practices for IT contracts and "contracts that work" will be identified.

Bio: Chris Wiggins has almost thirty years of experience in the IT industry in technical, business, and legal roles. Starting as a programmer, he has been an analyst, project leader, an enterprise technical leader for software development and client-servant training, the technical lead on the first consistent office environment for a Fortune 10 company, technical lead for EDS's advanced research lab in Ann Arbor, troubleshooter for major projects in trouble, infrastructure architect for a GM business unit, CTO for an EDS division, negotiator and technical lead for a global support agreement and strategic alliance between EDS and Microsoft, CTO of a dot com (bust), and contract negotiator for agreements with Fortune 10 companies, representing both the buyer and the seller at different times. Currently he is an independent contractor.

Chapter XI - Bio-Engineering

Title: Transcatheter Microwave Ablation for Cardiac Arrhythmia Therapy

Speaker: Dr. James Lin, University of Illinois - Chicago

Abstract: In the U.S., millions suffer from tachyarrhythmias, irregularly high heartbeat rates, and atrial fibrillation in the United States. To treat these patients, doctors have recently started clinical trials of cardiac ablation using microwave energy. A major technological challenge is the design and operation of the catheter antenna used in this treatment. In his talk, Lin will discuss microwave catheter antenna design, including discussion of computational and experimental validation in phantom and animal measurements. The results show that microwave catheter ablation is a safe and suitable procedure for treatment of cardiac arrhythmias, including arrhythmias due to conduction pathways located deep in the myocardium.

Bio: James C. Lin is a professor of electrical engineering, bioengineering, and physiology and bioplhysic at the University of Illinois-Chicago, where he has served as Director of Robotics and Automation Laboratory, Head of the Bioengineering Department, and Director of Special Projects in the College of Engineering. He is the author or editor of eight books, and author of 150 journal papers and book chapters. He received the B.S., M.S. and Ph.D. degrees in electrical engineering from the University of Washington, Seattle. His current research interests include biomedical imaging and sensing, electromagnetic engineering for biology and medicine, minimally invasive technology for medical interventions; mobile telecommunication safety, and interaction of

electromagnetic radiation including RF, microwaves, and lasers.

Chapter XII - Control Systems

Title: Walking and Running in Bipedal Robots: Control Theory and Experiments

Speaker: Dr. Jessy W. Grizzle, IEEE Fellow, Control Systems Laboratory, EECS Department, University of Michigan

Abstract: A canonical problem in bipedal robots is how to design a closed-loop system that generates stable, periodic motions (i.e., limit cycles). Some of the inherent difficulties facing the control engineer include: the intermittent nature of the contact conditions with the ground; the many degrees of freedom in the mechanisms; and underactuation. It is perhaps not surprising therefore that the most technologically advanced bipedal robots today are controlled on the basis of heuristic principles that result in restricted motions and require many experimental trials before successful locomotion is achieved.

This presentation summarizes recent theoretical advances that allow the systematic design of provably, asymptotically stable, walking and running gaits in underactuated, planar, bipedal robots. The resulting feedback control laws are time invariant. In particular, they are constructed around fundamental notions of invariance---properly extended to hybrid systems---and do not rely on trajectory tracking. In the case of walking, experimental confirmation of the principal results will be presented.

The presentation is designed to be accessible to control engineers of all types. The presentation is liberally illustrated with graphics and videos that explain and support the underlying theory.

Bio: Dr. Grizzle received the Ph.D. in electrical engineering from The University of Texas at Austin in 1983. Since September 1987, he has been with The University of Michigan, Ann Arbor, where he is a Professor of Electrical Engineering and Computer Science. His research interests have often focused on theoretical aspects of nonlinear systems and control, including geometric methods for continuous- and discrete-time systems, and observer design in discrete-time. He has been a consultant in the automotive industry since 1986, where he jointly holds fourteen patents dealing with emissions reduction through improved controller design. Prof. Grizzle has won many awards, served as Associate Editor for the Transactions on Automatic Control and Systems & Control Letters, and was elected a Fellow of the IEEE in 1997.

2005 Ballot Now On Line

By Maurice Snyder, Past IEEE/SEM Chair

The IEEE SEM Nominations Committee is proud to present the 2005 Ballot. While few of the races are contested, you can write in your own candidates for any office. Areas are provided on the ballot for offices without candidates. To submit other write-in candidates place the office title and candidates name in the area provided below. Remeber, however, that only full members may hold office.

If you wish to write in additional candidates, you can do so by attaching a separate sheet of paper. Sign the sheet and attach to your ballot.

Ballot Instructions
1. Download either the PDF version of the ballot (http://www.ieee-sem.org/admin/forms/2005ballot.pdf) or the Word version (http://www.ieee-sem.org/admin/forms/2005ballot.doc) and print.
2. Enter your name and membership number at the top of the ballot.
3. Review Voting Eligibility Requirements for restrictions applying to Part I and Part 2.
4. After voting, sign the ballot on the line at the bottom of the page
5. Fold ballot on dotted lines with the ballot names inside and return address on the outside, tape the flap to seal the ballot.
6. Place stamp and mail before November 13, 2004 to have your vote counted.

Voting Eligibility Requirements
- Student and associate members are NOT eligible to vote. Only IEEE/SEM Full Section Members for 2004 are eligible.
- All voting members may vote for Section Officers and Section Directors presented in Part I of the ballot.
- You MUST be a member of at least one of a chapter's societies to vote for that chapter's officers in Part 2 of the ballot.
- Vote for a candidate by checking the box to the left of the candidate's name. You may vote for only one candidate/office.

PART 1. IEEE SOUTHEAST MICHIGAN SECTION OFFICER & DIRECTOR POSITIONS

SECTION OFFICERS
CHAIR: Sam Barada
VICE CHAIR: Mark Ciechanowski
SECRETARY: Xinhua Gu
TREASURER: Arman Moein

DIRECTORS (Two-Year Terms):
MEMBERSHIP ACTIVITIES: Mohamad Berri (not for election)
PROFESSIONAL ACTIVITIES: Adel Marzougui (not for election)
TECHNICAL ACTIVITIES: Subra Genesan (not for election)
(The three positions above are not for election – positions valid until 12/31/05)

EDUCATIONAL ACTIVITIES: Chris Mi
STUDENT ACTIVITIES: Imad Makki

CHAPTER OFFICER POSITIONS
NOTE: Vote for Chapter Officers ONLY if you are a member of that Chapter or a member of the Society that Chapter represents.

CHAPTER I   (SP-001) Signals (CAS-004) Circuits & Systems, and (IT-012) Information Theory
CHAIR: Hoda Abdel-Aty Zohdy
VICE-CHAIR- Membership: Asaad Makki
VICE-CHAIR: Jacob Allen
VICE-CHAIR: M. Ahmadi
SECRETARY/TREASURER: Sam Barada

CHAPTER II (VT-006) Vehicular Technology
CHAIR: Arman Moein
VICE CHAIR: Srini Naidu
SECRETARY/TREASURER: Freeman Gates

CHAPTER III (AES-010) Aerospace & Electronic Systems and (COM-019) Communications
CHAIR (Vote for one): Robert Desoff, Benham Shahrrava
VICE CHAIR: (Write-in)
SECRETARY/TREASURER: (Write-in)

CHAPTER IV Trident (AP-003) Antennas (ED-015) Electron Dev. and (MTT-017) Microwave Theory & Techniques
CHAIR: Lisa Anneberg
VICE-CHAIR: Hossein Mosallaei
SECRETARY: Joe Burns
TREASURER: Richard Johnston

CHAPTER V (C-016) Computers
CHAIR: Subra Ganesan
VICE-CHAIR: Venkat Alladi
VICE-CHAIR: Pat Dessert
VICE-CHAIR: Mark Ciechanowski
TREASURER: Walter Schilling
SECRETARY: John Wei

CHAPTER VI (GRS-029) Geoscience and Remote Sensing
CHAIR: Robert G. Onstott
VICE CHAIR: A. H. Jayatissa
SECRETARY/TREASURER: (Write-in)

CHAPTER VII (PE-031) Power Engineering and (AS0-034) Industrial Applications
CHAIR: Ramas Ramaswami
VICE CHAIR: Asish Gollapalli
SECRETARY/TREASURER: (Write-in)

CHAPTER VIII (EMC-027) Electromagnetic Compatibility
CHAIR: Scott Lytle
VICE CHAIR-MEMBER SERVICES: (Write-in)
VICE CHAIR-PROFESSIONAL SERVICES: Bill Gilmore
VICE CHAIR-TECHNICAL SERVICES: Mark Steffka
TREASURER: Matt Feusse
SECRETARY: Kimball Williams
BACK-UP SECRETARY: Candace Suriano
VICE CHAIR-MEETINGS: Angela Kwan
VICE CHAIR-COMMUNICATIONS: Scott Lytle

CHAPTER IX (PEL-035) Power Electronics and
(IE-013) Industrial Electronics
CHAIR: Chris Mi
VICE CHAIR: Lei Xia
SECRETARY/TREASURER: (Write in)

CHAPTER X Engineering Mangement (EMS)
CHAIR: Mark Ciechanowski
VICE CHAIR: Marty Biancalana
SECRETARY: Dennis Siemiet
TREASURER: Steve Kishok

CHAPTER XI Engineering in Medicine & Biology (EMBS)
CHAIR: David Stiles
VICE CHAIR: Dr Barbara Oakley
SECRETARY/TREASURER: (Write in)

CHAPTER XII Control Systems (CS-023)
CO-CHAIR: Sam Barada
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VICE CHAIR-Professional: Rami Debouk
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TREASURER: Hafiz Khafagy

Events

Monday, Nov 1, 2004—6:00pm - Dinner, 6:30pm - Meeting
Executive Committe (XCOM) Meeting
All are invited to attend.
Location: Univ. of Michigan, Dearborn Professional Education Center Bldg. map
Contact: Suleiman Barada, 248-371-1700 ext 8692, sbarada@ieee.org

Wednesday, Nov 10, 2004, 6:00 pm
Fall Section Conference
Please join us for an evening of socializing and technical sessions.
Location: bps Training and Conference Center, 31301 Evergreen Road (near 13 Mile Road), Beverly Hills, MI.
Contact: Maurice Snyder, mfsnyder@ieee.org.

Thursday, Nov 11, 2004, 12 noon
Kickoff meeting for the IEEE/SEM Women in Engineering Affinity Group
Speaker: Dr. Carla Purdy, ECECS, University of Cincinnati, OH
The seminar is open to people from the community, IEEE members from industry and academia, students and faculty of women's studies programs, and members and affiliates of the SWE.
Location: 172 SEB, Oakland University
Contact: Professor Hoda S. Abdel-Aty-Zohdy, Ph.D, 248-370-2243, zohdyhsa@OAKLAND.EDU

Monday, Dec 6, 2004—6:00pm - Dinner, 6:30pm - Meeting
Executive Committe (XCOM) Meeting
All are invited to attend.
Location: Univ. of Michigan, Dearborn Professional Education Center Bldg. map
Contact: Suleiman Barada, 248-371-1700 ext 8692, sbarada@ieee.org

Tuesday, Dec 7, 2004
6:00pm Socializing and networking, 6:30pm Presentation
IEEE SEM Management Society Meeting
Topic tbd
Location: Ford Sustainable Mobility Technologies Lab II (SMTL) building, conference room 16, 15000 Commerce Drive North, Dearborn.
Contact: Mark Ciechanowski, mark.ciechanowski@ieee.org

Want to have your event listed here?

Fill out and submit the Event Submission Form at http://www.ieee-sem.org/?q=eventform.html

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Chapter VIII - EMC
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Chapter IX - Power and Industrial Electronics
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Chapter XI - Engineering in Medicine and Biology Society
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248-568-7341

Chapter XII - Control Systems
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