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Tucson Meeting Sponsored by Student Branch of Microwave Theory and Techniques:

Design, Analysis, and Applications of Waveguide-Fed Slot Arrays

Speaker: Sembiam R. Rengarajan, California State University Northridge

LOCATION: University of Arizona, Room ECE 107
DATE: Tuesday Nov 19, 6:00 pm

Refreshments Provided (pizza and soft drinks)

Waveguide-fed slot arrays find applications in numerous radar, remote sensing, and communication systems because of desirable features such as low loss integrated feed, and low volume. Accurate electromagnetic analysis and design tools have made it possible to produce such antennas in 'one pass' without any hardware iterations and still meet the stringent specifications commonly encountered. Because of the all metal construction, slot arrays are ideally suited to withstand severe radiation environment encountered in spacecraft applications.
This presentation will start with Elliott's procedure for designing waveguide fed linear and planar slot arrays. The required input data such as the scattering characteristics of isolated radiating and coupling elements may be obtained, based on techniques such as the method-of-moments (MoM) solution of the pertinent integral equations, or finite element techniques. Stegen-type normalization or an interpolation technique will be used with the computed slot data. External mutual coupling computation in the form of 'element by element' model is ideal for small to medium arrays while Floquet series of the infinite array model is suited for large arrays. Different types of feeds and sub-array architectures will be reviewed. Efficient implementation of Elliott's algorithm with choices for the values of radiating slot admittances and coupling slot impedances will be presented. Analysis techniques such as MoM and HFSS are employed to validate and assess the performance of the arrays. Enhancements to Elliott's technique that account for higher order mode coupling will be discussed. The use of full wave MoM technique in improving the design procedure will be illustrated. Some recent examples of practical slot arrays antennas for different applications will be presented.

BIOGRAPHY

Sembiam R. Rengarajan received the Ph.D. degree in Electrical Engineering from the University of New Brunswick, Canada in 1980. Since then he has been with the department of Electrical and Computer Engineering, California State University Northridge (CSUN), presently serving as a Professor. His experience includes Bharat Electronics Ltd., JPL, Chalmers University of Technology, Sweden, US Air Force Research Laboratory, and the Naval Research Lab. He has held visiting professorships at UCLA, Universidade de Santiago de Compostela, Spain, the University of Pretoria, South Africa, and the Technical University of Denmark. He has served as a consultant to Hughes Aircraft Co., Rantec, Saab Ericsson Space, Lockheed Martin, United Nations Development Program in India, and URS Alaska. His research interests include analytical and numerical techniques in electromagnetics with applications to antennas, scattering, and passive microwave components. Dr. Rengarajan has authored/co-authored more than 200 journal articles and conference papers. He is an IEEE Fellow, and a Fellow of the Electromagnetics Academy. He served as the Chair of the LA Chapter of IEEE Antennas and Propagation Society (1983-84), Chair of the IEEE San Fernando Valley Section (1995), and as an Associate Editor of the IEEE Transactions on Antennas and Propagation (2000-2003). He was the Chair of the Education Committee of the IEEE Antennas and Propagation Society and was an Associate Editor of the IEEE Antennas and Propagation Magazine. He received the Preeminent Scholarly Publication Award from CSUN in 2005, CSUN Research Fellow Award in 2010, and a Distinguished Engineering Educator of the Year Award from the Engineers' Council of California in 1995. Dr. Rengarajan received more than a dozen awards from NASA for his innovative research and technical contributions to the Deep Space Network Ground Systems Antennas and to the Spacecraft Antenna Research Group of JPL. In 2005 he was appointed as an Adjunct Professor at the Electromagnetics Academy of Zhejiang University in China. He was the guest editor of a special issue of Electromagnetics on slot arrays. He has served in the technical program committee of several symposia and serves as a reviewer to many periodicals. Dr. Rengarajan is presently the Vice Chair and Chair-Elect of the Commission on Waves and Fields of the United States National Committee of the International Union of Radio Science (USNC/URSI) during the 2009-2011 triennium.

INSIDE THIS ISSUE

Message to the Tucson Section

By Joseph Wu

I'd like to invite everyone in the Tucson Section to participate in IEEE. In the last year, we've conducted activities for schools, the University of Arizona, and for you, the membership. These activities are a great way to get involved in IEEE and show the impact of engineers in our community.

We have a great core of volunteers but we could always use your help. I'm asking people to get involved. With more people the Tucson Section could do so much more for the membership and this community.

If you're interested in helping out or becoming an officer, contact us through the following website:

http://ewh.ieee.org/r6/tucson/

Become an IEEE Senior Member!

Do you want to become a senior member of the IEEE? The IEEE wants to promote qualified candidates to senior membership! If you have 10 years of professional experience of which five years of significant professional performance, you are qualified for a senior member upgrade. Educational experience such as a bachelor's degree in an IEEE-designated field counts 4 years to that number, a master's degree counts 5 years and a doctorate counts 6 years. In order to find out more, point your web browser to www.ieee.org and search for senior membership!

Senior Membership:

http://www.ieee.org/web/membership/senior-members/

Applications can be found online. You will need the references of three current senior members or fellows. If you need assistance, contact Joseph Wu at joewu@ieee.org.

Save the date....

The next meeting is not yet planned

We'll be on a bit of a break until the next year. Until then, keep up to date through the website and make sure you're on the mailing list

Reliability Chapter Forming

A group is collecting signatures for a petition to form a Reliability Society Chapter for Arizona, pulling in IEEE members from the Tucson, Phoenix and Sierra Vista sections. If you are an IEEE member, but not a Reliability Society member, you can join the RS by paying half price ($17) to sign and help form the chapter. If you are a member of IEEE Reliability Society interested in signing the petition please contact Lou Gullo at Louis.Gullo@ieee.org.

Keep Up with the Tucson Section: Join our email list!

The Tucson Section email list delivers the latest IEEE Tucson news right to your email box.
To join, simply send an email to

listserv@listserv.ieee.org

Put the following in the body of the message:

subscribe TUCSON-SECTION-ALL yourfirstname yourlastname

You'll receive an email with instructions for confirming your new subscription.

Other News

Upcoming Conferences

2014 IEEE International Workshop Technical Committee on Communications Quality and Reliability
18 May - 23 May 2014
Westward Look Wyndham
Tucson, AZ
www.ieee-cqr.org

2014 IEEE International Symposium on Parallel & Distributed Processing Symposium (IPDPS)
19 May - 23 May 2014
Arizona Grand Resort
Phoenix, AZ
www.ipdps.org

U of A Student Branches

In the Tucson Section, there are active student branches. The Student Branch Chapter of the MTT frequently brings in speakers from the distinguished lecturer series.
The U of A main student branch is also active. They have been running an open lab space in the ECE department. They have been running their own meetings and occasionally have game nights.
If you're interested in finding out what they do, or want to help out with a donation go to:

http://uaieee.com
http://www2.engr.arizona.edu/~mtt/

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We're on the Web!
Visit us at:
http://ewh.ieee.org/r6/tucson

We need to hear from you!

How can we make IEEE a better organization? We can only do it with your help. As a volunteer organization, IEEE depends on your participation to accomplish all of our goals.

As you can see from this newsletter, there are lots of activities where you can actively contribute. Are you good at organization? Volunteer to head one of our Chapters or to help organize our general meetings. Want to show off or improve your internet skills? Volunteer to help with our Web site. Interested in promoting our field to the next generation of engineers? Help with Engineers Week, or as a judge for any of our student competitions.

Even if you only have a little bit of time, there's sure to be an IEEE opportunity that will interest you. Even if you have no free time at all, but have ideas for meetings or activities that promote engineering and the IEEE, let us know! We'd like to hear from you. Please contact Joseph Wu at joewu@ieee.org.