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September 2002

Microwave Filters - A Survey of Current Applications, Realizations and Design Techniques

MTT/AP/ED September Meeting



DATE: Thursday, September 12, 2002

TIME: 6:00 PM

SPEAKER: Tim Reeves, TRAK Microwave Corporation, Tampa, FL

ABSTRACT:

A general overview of today's microwave filter applications, realizations and design techniques is given. As with all technologies, the technology application drives the technology realization methodology and the subsequent design technique for that realization. To begin with, a broad survey is made of today's microwave filter applications including military, satellite, basestation, handset and optical communication systems. Resulting from each of these differing applications, many novel filter realizations have been developed. Each realization addresses application specific electrical, mechanical, manufacturing and costing requirements. Finally, a review of today's microwave filter design techniques is undertaken with particular attention being paid to filter synthesis, optimization and three-dimensional electromagnetic analyses.

BIOGRAPHY:

Mr. Tim Reeves is a senior engineer for TRAK Microwave Corp where he designs microwave-frequency filters for basestation and optical communication systems since February, 2001. Previously, he held the position of Filter Design Engineering Manager at Trilithic Incorporated in Indianapolis Indiana and was a Passive Designer with Com Dev Wireless in Canada. Mr. Reeves received his B. Sc. and M. Sc. degrees, both in Electrical Engineering from the University of Alberta in Edmonton Alberta Canada in 1995 and 1999 respectively.

He has also published a handful of refereed papers on the topic of direct synthesis of asymmetric attenuation poles producing networks. His particular areas of interest are synthesis of asymmetric cross-coupled cavity filters, realization of pseudo elliptic dielectric resonator filters and three dimensional electromagnetic analysis of low loss resonant structures.

LOCATION:

TRAK Microwave Corporation is located at 4726 Eisenhower Blvd., Tampa, FL. For driving directions, contact Shawn O'Brien at (727) 302-3493.

PLEASE RSVP:

Leave name and country of citizenship of attendees with Shawn O'Brien at (727) 302-3493 or by Email shawn_k_obrien@raytheon.com. *Bring a guest; non-members welcome!*

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CHAIRMAN: Quang Tang
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john.conrad@ieee.org

SIGNAL EDITOR: Quang Tang
Seminole Electric (813) 739-1222
q.tang@ieee.org

AWARDS: Jim Beall (727) 376-2790
j.beall@ieee.org

BYLAWS: Richard Beatie, PE
Consultant 813-289-0252
r.beatie@ieee.org

EDUCATION: Dr. Rudolf E. Henning, PE
University of South Florida (813) 974-4782
henning@eng.usf.edu

PACE: Scott Haynes and Richard Martino
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wshaynes@ieee.org or
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STUDENT BRANCH CO-ADVISORS:
Dr. Paris Wiley, USF (813) 974-4743
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STUDENT BRANCH MENTOR: Jim Howard
Tampa Electric Co. (813) 275-3421
j.howard@ieee.org

STUDENT BRANCH CHAPTERS: Jemery Baksh
(813) 974-4776
jeremy.baksh@ieee.org

PES/IAS CHAPTER: Arthur L. Nordlinger, PE
813-508-2952
a.nordlinger@ieee.org

MTT/AP/ED CHAPTER: Shawn K O'Brien
Raytheon Systems Co.
shawn_k_obrien@ieee.org

COMP/AESS CHAPTER: James S. Lumia
(813) 832-3501
jlumia@ieee.org

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Raytheon Systems Co. (727) 302-2299
rcrowely@ieee.org

LIFE MEMBER CHAPTER: Jules Joslow
ElectroMark, Inc. (800) 274-2383
jjoslowemi@aol.com

GOLD: Dennis Trask
d.trask@ieee.org

WEB PAGE <http://ewh.ieee.org/r3/floridawc>

WEB MASTER: Richard Beatie, PE
r.beatie@ieee.org

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Quang Tang - Seminole Electric Cooperative, Inc.
P.O. Box 272000, Tampa, Florida 33688-2000
Voice: (813) 739-1222 Fax: (813) 264-7906
E-MAIL: q.tang@ieee.org
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Chair's Comment

By Quang Tang

Congratulations to Jim Howard for winning the Regional Power Engineering Society Outstanding Engineers of the year. Please check out the article on page 4 for awards details.

Our Section GOLD (Graduated Of the Last Decade) Chapter has officially been approved by IEEE Headquarters. Thanks to Dennis Trask for his great effort. Please join me and welcome Scott Haynes and Richard Martino to the Section Executive Committee. Scott and Richard will co-chair the Professional Activity Committee for Engineers (PACE).

Have a great Labor Day!

Don't Miss This Opportunity Last Chance to Receive Your PE Required PDHs

The FWCS PE/IA Chapter Presents:

An Update on the National Electric Safety Code (NESC)

Date/Time: Friday, November 1, 2002, 8:30am - 3pm

Location: ETRC, Tampa

Course Overview: This Seminar will cover the most recent changes to the code, as well as the process whereby changes and additions are made to the code. Watch future additions of the Signal newsletter for more details on how to reserve your place at this upcoming seminar.

Call for Nominations

By Jim Beall j.beall@ieee.org

The nominating Committee of the Florida West Coast Section is looking for nominations for the various positions in the section and its technical chapters and committees. If one were to look at the masthead of this newsletter there are 20 or more volunteer positions. Some of the members on the list will be finishing their term. Many of these positions also need a vice chair or assistant in training to move up to the chair in the future.

Some members have started attending the Section Executive Committee meetings and getting involved. It is these members and others unknown to us at the moment that will be running the section in the future.

If you have an interest in the section or know another member that is interested please let Jim Beall or Jim Howard know. Our email addresses are: j.beall@ieee.org or j.howard@ieee.org.

Digital Hardware Design

"Designing High-Performance Systems with Virtex-II Pro FPGA Devices"

Computer Society Chapter Meeting

Date/Time: Tuesday, September 10, 2002, 6:00 PM to 7:30 PM

Location: Avnet – Cilicon, 380 Park Place, Suite 170
Clearwater, FL 33759

RSVP: Jim Watts, jim.watts@avnet.com or 727-507-5000

This presentation will provide a brief overview of the features of the newest Xilinx FPGA device family before going into detail on the embedded hard cores and flexible I/O signaling options. The capabilities, interfaces and tool support for the embedded PowerPC (300 MHz+, 420 Dhrystone MIPS) processor core will be discussed. Also, the architecture and performance options of the embedded multi-gigabit (RocketIO) transceiver core will be presented. This core is available in all Virtex-II Pro device and provides support Gbit Ethernet, XAUI, Fibre Channel, Infiniband and other communications standards. The 23 different signaling standards will also be discussed.

This is an open meeting. Nonmembers and students are welcome. Complementary snacks and cold drinks will be provided.

Mark Graham has been a field application engineer for Xilinx for the past 7 years. Prior to Xilinx, Mark worked for 13 years as a high-speed digital designer for Lockheed Martin and for Texas Instruments. He graduated with a BSEE degree from the University of Tennessee.

Directions: The Avnet – Cilicon local office is between SR60 (Gulf-to-Bay) and Drew Street, just east of US19 (a few hundred yards behind Bennigan's and Key West Grill).

To get there from the west, go east on SR60. Turn left (north) at the second light after the US19 overpass (Park Place). Take your second left after the light (North Park Place in complex). The building will be a couple hundred yards ahead on the right side. Avnet's number is (727) 507-5000.

This is a Joint Meeting with the Programmable Logic Users Group (www.pl-ug.org)



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Power Engineering Society Regional Outstanding Awards

IEEE is broken into 10 Regions worldwide and each year the Power Engineering Society recognizes up to 10 Outstanding Engineers, one per region. These Engineers are nominated by a Chapter in their Region and must have already been awarded the Chapters Outstanding Engineer Award. The winner for the Chapter awards are nominated for the Regional Outstanding Engineer and, from the nominations, the selection committee reviews the accomplishments of each of the nominees and selects one winner per Region. Not all Regions will have a nomination or winner each year.



This years winners are shown above and listed below:

- Region 1 - Non Awarded
- Region 2 - William Keagle Jr. (Baltimore, MD-USA)
- Region 3 - James Howard (Tampa, FL-USA)
- Region 4 - Danial Nordell (Minneapolis, MN-USA)
- Region 5 - Non Awarded
- Region 6 - Ram Adapa (Palo Alto, CA-USA)
- Region 7 - Non Awarded
- Region 8 - Vladimir Dimcev (Skopje, Macedona)
- Region 9 - Enrique Tejera (El Dorado, Panama)
- Region 10 - Subrata Mukhopadhyay (New Delhi, India)

Left to right

Barney Speckman, PES VP Membership and Chapters, William Keagle, Enrique Tejera, Jim Howard, Vladimir Dimcev, Ram Adapa, Subrata Mukhopadhyay, Danial Nordell

*** MARK YOUR CALENDAR ***



March 19-20, 2003
Tampa Convention Center
Tampa, Florida

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City Technology – Stuff That Works

By Ralph Painter

A wonderful thing is going on at the City College of New York. Gary Benenson from the school of engineering and James L. Neujahr from the school of education have collaborated to produce City Technology, *Stuff That Works*, a series of five teacher guides for elementary and middle school teachers to use to introduce the world of technology to their students. The titles of the guides are a good indication of the content: *Mechanisms and Other Systems*; *Mapping*; *Signs Symbols and Codes*; *Packaging and Other Structures* and *Designed Environments*. Gary and Jim have taken a practical, hands-on, discovery approach to learning that not only teaches particular technologies, but also introduces the process of design. The guides do a great job of bridging the gap between existing elementary and middle school curricula that tend to ignore technology and the very advanced material available in high schools and colleges.



City College hosts a web site that includes discussion forums dedicated to each group of teachers using the guides. IEEE members serve as online advisors for these forums to clarify technical issues, to encourage students and teachers and to provide background information about discoveries made by students and teachers. These forums provide ideal opportunities for IEEE members to share experiences from their professional lives so students can begin to understand how engineers go about their work. Often the online discussion forums are the first contact the teachers and students have with a member of the engineering profession. The online forums are a very convenient way for practicing engineers to assist teachers and students without interrupting their schedules and without leaving their offices or homes. All that is needed is a computer and a simple dial-up modem because City College has designed the web site to work well without requiring advanced broadband computer connections. Also, IEEE's Manager of Pre-College Education, Mr. Doug Gorham, serves on the advisory board for the City Technology project and IEEE staff support the project by recruiting the online engineers, assisting in the training of the online mentors and in recruiting school districts to participate in the project. The City Technology program complements IEEE's efforts to promote technical literacy for all students and to attract more students to careers related to mathematics, science, engineering and technology by ensuring a positive introduction to technical material in elementary and middle schools.

If the value of the *Stuff That Works* materials and methods can be judged by the responses of teachers and students, then the program is a smashing success. Leslie Hoelleger, sixth grade teacher, Lakeland Copper Beach middle school, New York says, "The learning activities went over incredibly well in my classroom – the kids were wildly successful beyond my expectations! I attribute this success to our ability to tap into the expertise of other teachers and particularly the online engineers. Asking the experts (engineers) was a favorite feature of this program for my students." Bradley Iverson, fifth grade teacher, Iverson elementary school, Nevada, is also enthusiastic, "I've embraced *Stuff That Works*. These activities, more than any others, have helped my students develop confidence in designing and changing their world."

The city Technology project is funded in part by the National Science Foundation with additional support from City College and from the IEEE. This article is based upon work supported by the National Science Foundation under Grant No. ESI-0096627. Any opinions, findings, conclusions or recommendations expressed in this article are those of the authors and do not necessarily reflect those of the National Science Foundation.

The above pictures are taken from the City Technology project. Look for the full article in September *Institute* issue.

Brain Teaser Challenge Column

By Butch Shadwell

August BTC Solution

If you recall last month's problem from a fellow sporting a watermelon seed, you were asked to identify a mathematical method for manipulating vector graphics and/or a robot manipulator coordinate system. I got a couple of correct responses that linear algebra, or matrix manipulation, is the simplest way to accomplish these calculations. If a path through a multidimensional space is described in vector form, a linked list of coordinate points, then translation and rotation is a fairly simple matter of matrix multiplication. This works with rectangular and polar coordinates and in fact with any number of axes of freedom, such as a multi-jointed manipulator.

Maybe I'll see you on stage some time.

September BTC

Here is an oldie but a goodie -

Floyd Anemone lived in Denver, Colorado. Growing up in the mile high city was complicated by the fact that Floyd, from his earliest memories, was completely enamored of the sea. His mother's job at the Post Office cafeteria barely kept corn flakes on the table, so the prospects of going to the seashore were remote. Then one morning, as Floyd was grasping the last corn flake from the table top, he noticed a strange ad on the cereal box. There was a contest that would award the lucky winner the birthday party of their dreams.

To make a long story short, Floyd won the prize and elected to have his thirtieth birthday off the Florida coast under 33 feet of water. To decorate the affair the cereal people bought 100 balloons filled with air at sea level. Each balloon had a volume of one cubic foot, making them an impressive array of colorful spheres. When the party began at the sub-surface local it was clear that something had happened to those impressive balloons. Though still spherical, they had shrunken quite a bit. The question for the readers this month is, assuming that the temperature of the air in the balloons was the same as it was at the surface, what is the volume of each balloon now? And for extra credit, what is the change in the balloon's diameter in inches? Also ignore any effects of the elasticity of the rubber envelopes of the balloons.

Questions or comments to the Brain Teaser Challenge, please contact Butch Shadwell at 904-223-4465 (voice), 904-223-4510 (fax), b.shadwell@ieee.org (email), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328. <http://www.se.mediaone.net/~butchs/>

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Phone: 727-773-9898
Fax: 727-773-9899

E-mail: Richard.Brounley@verizon.net

September 2002 Calendar of Events

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 <i>Labor Day</i>	3	4	5	6	7
8	9	10 <i>EXCOM at TECO Plaza 5:30pm-7:30pm. COMP/AESS Meeting 6:00PM</i>	11	12 <i>MTT/AP/ED Meeting on Microwave Filters TRAK, 6:00PM</i>	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

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