香港城市大學 City University of Hong Kong

Department of Electronic Engineering

毫米波 State Key Laboratory of Millimeter Waves 國家重點實驗室（香港）

IEEE (HK) Section AP/MTT

Seminar on

New Studies on Ring Resonators for Compact Planar Multi-Band Bandpass Filters

by

Prof. Lei Zhu

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Abstract

This presentation deals with the proposal, design and implementation of a class of compact dual- and triple-band bandpass filters with two transmission poles in each passband using a single microstrip ring resonator. Two methods are first presented to design two types of dual-mode dual-band bandpass filters using a single resonator. One is to excite the two pairs of the first- and third-order degenerate resonant modes of a ring resonator; the other is to use the first two pairs of degenerate resonant modes of a ring resonator. To achieve these targets, the port-separation angle along a ring is chosen as 450/1350, respectively. Inspired by these two methods, the first three pairs of degenerate modes of a ring resonator are further explored to design a compact dual-mode triple-band bandpass filter on a single resonator. The operating principle and design procedure for all filters are described based on their equivalent transmission-line model. Several prototype filters are finally designed, fabricated and measured. The measured results show the two visible poles in each passband, thus evidently proving our proposed design theory.

Biography

Lei Zhu (S'91 – M'93 – SM'00-F'12) received the B. Eng. and M. Eng. degrees in radio engineering from the Nanjing Institute of Technology (now Southeast University), Nanjing, China, in 1985 and 1988, respectively, and the Ph.D. Eng. degree in electronic engineering from the University of Electro-Communications, Tokyo, Japan, in 1993. From 1993 to 1996, he was a Research Engineer with the Matsushita-Kotobuki Electronics Industries Ltd., Tokyo, Japan. From 1996 to 2000, he was a Research Fellow with the Ecole Polytechnique de Montreal, University of Montreal, Montreal, Quebec, Canada. Since July 2000, he has been an Associate Professor with the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore. His research interests include planar filters, planar periodic structures, planar antennas, numerical EM modeling, and deembedding techniques. He has authored or coauthored over 200 papers in peer-reviewed journals and conference proceedings. His papers have been cited more than 2150 times with the H-index of 24 (source: ISI Web of Science). He was an Associate Editor for the IEICE Transactions on Electronics (2003-2005). Dr. Zhu has been an Associate Editor for the IEEE Microwave and Wireless Components Letters since October 2006, and an Associate Editor for the IEEE Transactions on Microwave Theory and Techniques since June 2010. He has been a Member of the IEEE Microwave Theory and Techniques Society (IEEE MTT-S) Technical Committee 1 on Computer-Aided Design since June 2006. He was a General Chair of the 2008 IEEE MTT-S International Microwave Workshop Series (IMWS'08) on Art of Miniaturizing RF and Microwave Passive Components, Chengdu, China, and a Technical Program Committee (TPC) Chair of the 2009 Asia-Pacific Microwave Conference (APMC'09), Singapore. He was the recipient of the 1997 Asia-Pacific Microwave Prize Award, 1996 Silver Award of Excellent Invention from the Matsushita-Kotobuki Electronics Industries Ltd., and 1993 First-Order Achievement Award in Science and Technology from the National Education Committee, China. Dr. Zhu is a Fellow of the IEEE for contributions to modeling, design and development of planar microwave filters.

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City University of Hong Kong

***** ALL ARE WELCOME *****

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