PIERS 2019 Rome

PhotonIcs & Electromagnetics Research Symposium

also known as Progress In Electromagnetics Research Symposium

Program

June 17 - 20, 2019

Rome, ITALY

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15:10 CMOS Microwave Bandpass Filter Using High Q Active Inductor
Qi Wang (Chonbuk National University); Phirun Kim (Chonbuk National University); Girdhari Chaudhary (Chonbuk National University); Jongsik Lim (Soonchunhyang University); Yongchae Jeong (Chonbuk National University);

15:30 Compact Wide-stopband Quarter-mode SIW Bandpass Filter with Triangle Cavity
Phirun Kim (Chonbuk National University); Phanam Pech (Chonbuk National University); Jongsik Lim (Soonchunhyang University); Dal Ahn (Soonchunhyang University); Yongchae Jeong (Chonbuk National University);

15:50 Transmission Lines Modeling Approach Based on the Approximation of Pade
Zahra Bouzidi (Cadi Ayyad University); Abdelaziz El Idrissi (Cadi Ayyad University); Hicham Rouijaa (Hassan University 1); Mohamed Saih (University of Sultan Moulay Slimane);

16:10 Measurement of Parameters of Objects in Nonstandard Guiding Systems and in Free Space
Vladimir Ivanovich Evseev (LLC "Arzamas Instrument-making Design Bureau"); Oleg Veniaminovich Lavrichev (JSC "Arsamassky Priborostroitelny Zavod imeni Plandina"); Elena Alexandrovna Lupanova (Nizhniy Novgorod State Technical University n.a. R. E. Alekseev); Sergey Michailovich Nikulin (Alekseev's Nizhny Novgorod State Technical University);

16:30 **Coffee Break**

17:00 Comparative Study of Multipactor Effect in Rectangular and Parallel-plate Waveguides Partially Loaded with Dielectric
A. Berenguer (Universidad Miguel Hernandez de Elche); Angela Coves Soler (Universidad Miguel Hernandez de Elche); E. Bronchalo (Universidad Miguel Hernandez de Elche);

Session 4P3b
Microwave and Millimeter Wave Circuits and Devices 2

Thursday PM, June 20, 2019

Room 7 - 1st Floor

Chaired by Yongchae Jeong, Shinichi Tanaka

17:20 A CMOS Single Stage Sub-harmonic Mixer with Two Conversion Modes for Fast Spectrum Sensing Functionality
Seongjin Bae (Chonbuk National University); Donggu Im (Chonbuk National University);

17:40 Wideband Phase Shifter Using 3 Types of LC Resonant Circuits for Phase Slope Alignment
Youna Jang (Soonchunhyang University); Maaz Salman (Soonchunhyang University); Yongchae Jeong (Chonbuk National University); Kwansun Choi (Soonchunhyang University); Sang-Min Han (Soonchunhyang University); Dal Ahn (Soonchunhyang University);

18:00 A High-efficiency DC-to-RF/RF-to-DC Conversion Module with Zero-threshold FET for Bidirectional Wireless Power Transfer
Takaharu Kume (The University of Electro-Comminications); Ryo Ishikawa (The University of Electro-Comminications); Kazuhiko Honjo (The University of Electro-Comminications);

18:20 Bandwidth Broadening of a Waveguide Circulator for Industrial Dual-band Magnetrons
Kaviya Aranganadin (Hanyang University); Hua-Yi Hsu (National Taipei University of Technology); Ming-Chieh Lin (Hanyang University);

18:40 Modeling a Gyrotron Mode Converter Using 3-D CFDTD Simulation
Ming-Chieh Lin (Hanyang University); Jianbo Jin (Forschungszentrum Karlsruhe); Stefan Illy (Karlsruhe Institute of Technology (KIT)); Konstantinos A. Avramidis (Karlsruhe Institute of Technology (KIT)); Manfred Thumm (Karlsruhe Institute of Technology); John Jelonnek (Institute for Pulsed Power and Microwave Technology, Karlsruhe Institute of Technology);

Session 4P4
Computational Electromagnetics, Hybrid Methods

Thursday PM, June 20, 2019

Room 8 - 1st Floor

Chaired by Vladimir Okhmatovski, Mikhail Sergeyevich Mikhailov

Wideband Phase Shifter Using 3 Types of LC Resonant Circuits for Phase Slope Alignment

Youna Jang[1], **Maaz Salman**[1], **Young Chae Jeong**[2], **Kwan Sun Choi**[1], **Sang-Min Han**[1], **and Dal Ahn**[1]

[1]Soonchunhyang University, South Korea
[2]Chonbuk National University, South Korea

Abstract— This paper proposes a new wideband phase shifter, aligning phase slope between the reference line and main line to reduce the slope deviation using 3 types of LC resonance circuits (series, parallel and composite type). Compared to the conventional ones, the proposed phase shifters have several advantages such as a simple structure with single layer, accurate LC values from the derived formulas that are not optimization values. In addition, any phase shift value is applicable to the proposed theory, since the phase shift range of the proposed phase shifter can be implemented from 0 to 360 degree. The design theory of the proposed phase shifter is derived by taking a differential of difference between reference line and LC resonant circuit with respect to angular frequency, then calculate the value of each element of L and C at the center frequency. Although the proposed phase shifter is designed with only one or three resonant circuits in this paper, the number of resonant circuits constituting the main line can be three or more. By the design theory, the total sum of the phase values allocated to each resonant circuit may be a phase shift value to indicate a desired phase difference between the reference line and the main line. To validate the design theory, 180° wideband phase shifters with singles (series and parallel) and composite resonant circuits are designed, fabricated, and measured. The fractional bandwidth of the proposed circuits for a parallel and a composite resonant circuit are both greater than 64%. Therefore, the measurement results agree well with the design theory within 0.5 dB insertion loss and ±10° phase deviation, except fabrication error.