PIERS 2018 Toyama

Progress In Electromagnetics Research Symposium

Program

August 1 - 4, 2018
Toyama, JAPAN

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15:20 Dispersion Characteristic of Elliptical Waveguide under New Boundary Condition
Shamini Pillay Narayanasamy Pillay (*Multimedia University*); *Deepak Kumar* (*Multimedia University*);

15:40 **Coffee Break**

Session 3P4b
SC1: Computational Techniques in Electromagnetics and Applications

Friday PM, August 3, 2018

Room T4

Organized by Yoichi Okuno, Tsuneki Yamasaki

Chaired by Yoichi Okuno, Tsuneki Yamasaki

16:00 Numerical Analysis of a Leapfrog ADI-FDTD Method for Metamaterial Maxwell's Equations
Meng Chen (*Xiangtan University*); *Yunqing Huang* (*Xiangtan University*); *Jichun Li* (*University of Nevada, Las Vegas*);

16:20 A Grating-based Plasmon Index Sensor: Possibility of Workspaces with Tractable Minimal TM Efficiencies
Xun Xu (*Kyushu Sangyo University*); *Miaoning Zheng* (*South China Normal University*); *Yoichi Okuno* (*South China Normal University*);

16:40 Analysis of Inter-Bundle Crosstalk in High Speed MIMO Signalling in Powerline Communication Channels
Modisa Mosalaosi (*University of KwaZulu-Natal*); *Thomas Joachim Odhiambo Afullo* (*University of KwaZulu-Natal (UKZN)*);

17:00 Numerical Analysis of Pulse Reflection Response from Conducting Strips in Dispersion Media with Air Layer
Ryosuke Ozaki (*Nihon University*); *Tsuneki Yamasaki* (*Nihon University*);

17:20 Scattering of Electromagnetic Wave by a Rectangular Cylinder Consist of Conducting Strips
Tsuneki Yamasaki (*Nihon University*); *Toshiki Shibayama* (*Nihon University*); *Ryousuke Ozaki* (*Nihon University*);

Session 3P5
SC4: Advanced Antenna and RF Circuits Design

Friday PM, August 3, 2018

Room T5

Organized by Malay Ranjan Tripathy, Yongchae Jeong

Chaired by Malay Ranjan Tripathy, Yongchae Jeong

13:00 Effect of Mutual Coupling within Elements of Array-units Beyond Full Wavelength Element Spacing for Linear Arrays
Jacob Adopley (*Ghana Technology University College*);

13:20 Design of a Size-reduced Microwave Amplifiers Using an Asymmetrical Spiral-DGS
Jongsik Lim (*Soonchunhyang University*); *Phanam Pech* (*Chonbuk National University*); *Heeyoun Choi* (*Chonbuk National University*); *Yongchae Jeong* (*Chonbuk National University*); *Sang-Min Han* (*Soonchunhyang University*); *Dal Ahn* (*Soonchunhyang University*);

13:40 $\lambda/2$ Stepped Impedance Resonator Parallel/Antiparallel Coupled-line Bandpass Filter with a Wide Stopband Characteristic
Phirun Kim (*Chonbuk National University*); *Phanam Pech* (*Chonbuk National University*); *Girdhari Chaudhary* (*Chonbuk National University*); *Jongsik Lim* (*Soonchunhyang University*); *Malay Ranjan Tripathy* (*Amity University Uttar Pradesh*); *Yongchae Jeong* (*Chonbuk National University*);

14:00 Flexible Printed Active Antenna for Digital Television Reception
Teerapong Pratumsiri (*Chulalongkorn University*); *Panuwat Janpugdee* (*Chulalongkorn University*);

14:20 Reliability Ranking of Nodes: A Case of Revolution
Priya Ranjan (*Amity University Uttar Pradesh*); *Harshit Pandey* (*Amity University Uttar Pradesh*); *Malay Ranjan Tripathy* (*Amity University Uttar Pradesh*); *Cher-Ming Tan* (*Chang Gung University*); *Saumay Pushp* (*KAIST*);

14:40 A Compact Slotted 4 Element Large Wideband MIMO Antenna for Wireless Application
Bishal Mishra (*Amity University Uttar Pradesh*); *Rehan Ahmed Siddiqui* (*Amity University Uttar Pradesh*); *Malay Ranjan Tripathy* (*Amity University Uttar Pradesh*); *Daniel Ronnow* (*University of Gavle*);

$\lambda/2$ Stepped Impedance Resonator Parallel/Antiparallel Coupled-line Bandpass Filter with a Wide Stopband Characteristic

Phirun Kim[1], **Phanam Pech**[1], **Girdhari Chaudhary**[1], **Jongsik Lim**[2], **Malay Ranjan Tripathy**[3], **and Yongchae Jeong**[1]

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Abstract— Microwave bandpass filters (BPFs) are important components in most microwave systems to suppress the unwanted harmonic signals and out-of-band interferences. In this paper, a half-wavelength ($\lambda/2$) stepped impedance resonator (SIR) BPF is presented using parallel/antiparallel coupled lines. Different with the conventional parallel coupled line, the antiparallel coupled line of $\lambda/2$ SIR BPF can provide a transmission zero at the first spurious frequency and more highly selectivity characteristic for all step impedance ratio (K). The antiparallel coupled line may be used for $\theta_0 \neq \pi/2$ at the operating center frequency (f_0). Thus, the antiparallel coupled line can be used in $\lambda/2$ SIR BPF because θ_0 of the coupled lines are always less than $\pi/2$. The S-parameter comparison of the proposed and the conventional SIR BPFs is shown in Fig. 1 with $f_0 = 2.6$ GHz. The conventional SIR BPF [1] produces the first spurious frequency at 5.59 GHz with $K = 0.8$. However, the proposed SIR BPF can produce a transmission zero to suppress the first spurious frequency by using antiparallel-coupled line with the same K. Then the first spurious frequency of proposed BPF is moved to 8.58 GHz with better the stopband attenuation. The first spurious of the conventional SIR BPF can be moved to 8.58 GHz when $K = 0.265$ as shown in Fig. 1. However, the transmission line and coupled line of conventional SIR BPF with $K = 0.265$ are difficult to fabricate with a microstip circuit technology. Fig. 2 shows the S-parameter characteristics of proposed SIR BPFs with different K. In this simulation, K varies from 0.4 to 1.6 with $n = 2$ and $Z_2 = 50\,\Omega$. As can be seen in Fig. 2, the first spurious frequency is moved close to the passband when K increases and maintaining the passband characteristics. Using the proposed filter, a wide stopband characteristic and high stopband attenuation can be obtained without fabrication difficulty in a microstrip technology.

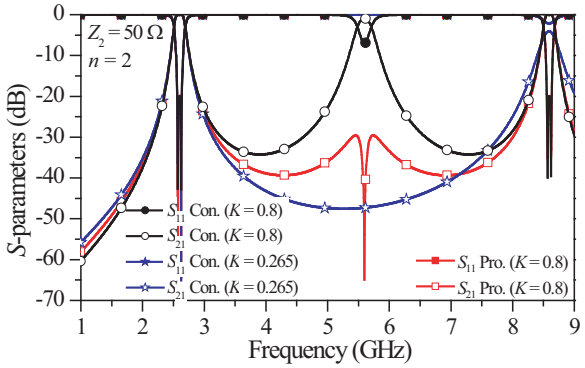

Figure 1.

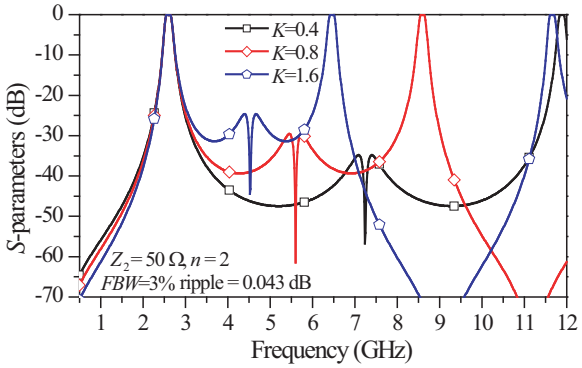

Figure 2.

REFERENCES

1. Makimoto, M. and S. Yamashita, *Microwave Resonators and Filters for Wireless Communication: Theory, Design, and Application*, 65–106, Springer-Verlag, Berlin, Heidelberg, New York, 2001.