

---

**ELECTROMAGNETIC  
WAVES                      PIERC 05**

---

**Progress**

**In**

**Electromagnetics**

**Research C**

© 2008 EMW Publishing. All rights reserved.

No part of this publication may be reproduced. Request for permission should be addressed to the Publisher.

All inquiries regarding copyrighted material from this publication, manuscript submission instructions, and subscription orders and price information should be directed to: EMW Publishing, P. O. Box 425517, Kendall Square, Cambridge, Massachusetts 02142, USA.

E-ISSN 1937-8718

---

**ELECTROMAGNETIC  
WAVES                      PIERC 05**

---

**Progress**

**In**

**Electromagnetics**

**Research C**

**Chief Editor: Weng Cho Chew**

EMW Publishing

Cambridge, Massachusetts, USA



## CONTENTS

**PERFORMANCE EVALUATION OF ADAPTIVE UWB SYSTEM WITH MULTIPLE ANTENNAS***M.-S. Baek and H.-K. Song*

1	Introduction . . . . .	1
2	System Model . . . . .	2
3	Basic Theory of Adaptive Transmission . . . . .	3
4	Adaptive Antenna Selection . . . . .	4
5	Performance Evaluation and Discussion . . . . .	6
6	Conclusions . . . . .	10

**DESIGN OF A NOVEL MONOPOLE UWB ANTENNA WITH A NOTCHED GROUND***L. Wang, W. Wu, X.-W. Shi, F. Wei, and Q.-L. Huang*

1	Introduction . . . . .	13
2	Antenna Design . . . . .	14
3	Result and Discussion . . . . .	17
4	Conclusion . . . . .	18

**DETERMINATION OF THE FREQUENCY-AMPLITUDE RELATION FOR NONLINEAR OSCILLATORS WITH FRACTIONAL POTENTIAL USING HE'S ENERGY BALANCE METHOD***S. S. Ganji, D. D. Ganji, and S. Karimpour*

1	Introduction . . . . .	21
2	Description of Energy Balance Method . . . . .	22
3	Numerical Examples . . . . .	23
4	Discussion of Examples . . . . .	25
5	Conclusion . . . . .	30

**SHARP FOCUS AREA OF RADIALY-POLARIZED GAUSSIAN BEAM PROPAGATION THROUGH AN AXICON***V. V. Kotlyar, A. A. Kovalev, and S. S. Stafeev*

1	Introduction . . . . .	35
2	Radial Symmetric FDTD . . . . .	36

3	Simulation Results .....	38
4	Conclusions .....	41

**IMPROVED COMPACT BROADBAND BANDPASS  
FILTER USING BRANCH STUBS CO-VIA STRUCTURE  
WITH WIDE STOPBAND CHARACTERISTIC**

*W.-J. Lin, C.-S. Chang, J.-Y. Li, D.-B. Lin, L.-S. Chen, and  
M.-P. Hounq*

1	Introduction .....	46
2	Proposed Broadband Bandpass Filter .....	47
3	Implementation and Experimental Results .....	51
4	Conclusion .....	53

**DIELECTRIC PERMITTIVITY MEASURING  
TECHNIQUE OF FILM-SHAPED MATERIALS AT LOW  
MICROWAVE FREQUENCIES FROM OPEN-END  
COPLANAR WAVEGUIDE**

*J. Hinojosa*

1	Introduction .....	57
2	Measuring Cell and Measurement Procedure .....	59
3	Determination of the Complex Permittivity .....	61
4	Experimental Results .....	65
5	Conclusion .....	68

**IMPROVEMENT IN THE ANALYTICAL CALCULATION  
OF THE MAGNETIC FIELD PRODUCED BY  
PERMANENT MAGNET RINGS**

*S. I. Babic and C. Akyel*

1	Introduction .....	71
2	Basic Expressions .....	72
3	Calculation Method .....	74
4	Examples .....	78
5	Conclusion .....	81

**LOW ACTUATION VOLTAGE KA-BAND FRACTAL  
MEMS SWITCH**

*M. Jahanbakht, M. N. Moghaddasi, and A. A. Lotfi Neyestanak*

1	Introduction .....	83
2	Theory .....	84

3 Results ..... 87  
 4 Conclusion ..... 91

**COMPRESSION OF MULTICARRIER PHASE-CODED RADAR SIGNALS BASED ON DISCRETE FOURIER TRANSFORM (DFT)**

*R. Mohseni, A. Sheikhi, and M. A. Masnadi-Shirazi*

1 Introduction ..... 93  
 2 MCPC Signal and its Characteristics ..... 94  
 3 Conventional Method for the MCPC Pulse Compression .... 95  
 4 The Suggested Method for Compressing the MCPC Signal .. 98  
 5 The Effect of Sampling Frequency on the Compression Quality 103  
 6 Polyphase Implementation of the Oversampled MCPC Pulse Compression Filter ..... 104  
 7 Comparing Different Methods from Computational Complexity Point of View ..... 109  
 8 Conclusions ..... 115

**Comment on “PERFORMANCE ANALYSIS OF EMI SENSOR IN DIFFERENT TEST SITES WITH DIFFERENT WAVE IMPEDANCES”**

*S. M. Satav* ..... 119

**Erratum to “PERFORMANCE ANALYSIS OF EMI SENSOR IN DIFFERENT TEST SITES WITH DIFFERENT WAVE IMPEDANCES”**

*S. Ghosh* ..... 123

**PERFORMANCE EVALUATION OF WIMAX SYSTEM USING CONVOLUTIONAL PRODUCT CODE (CPC)**

*A. Ebian, M. Shokair, and K. H. Awadalla*

1 Introduction ..... 126  
 2 Description of the Physical Layer of a WIMAX System ..... 126  
 3 Detailed Description of CPC Method ..... 128  
 4 Results ..... 131  
 5 Conclusions ..... 132

**HIGH RESOLUTION DOA ESTIMATION IN FULLY COHERENT ENVIRONMENTS***S. N. Shahi, M. Emadi, and K. Sadeghi*

1	Introduction . . . . .	135
2	Background . . . . .	136
3	Bartlett-MUSIC Method . . . . .	141
4	Simulation Results . . . . .	143
5	Conclusion . . . . .	147

**WIRELESS BIO-RADAR SENSOR FOR HEARTBEAT AND RESPIRATION DETECTION***B.-J. Jang, S.-H. Wi, J.-G. Yook, M.-Q. Lee, and K.-J. Lee*

1	Introduction . . . . .	150
2	Operating Principle of a Wireless Bio-radar Sensor . . . . .	151
3	SNR Analysis . . . . .	155
4	Wireless Bio-radar Sensor Design and Measurement Results . . . . .	162
5	Conclusion . . . . .	167

**ON THE COMPARISON OF INTERSYSTEM INTERFERENCE SCENARIOS BETWEEN IMT-ADVANCED AND FIXED SERVICES OVER VARIOUS DEPLOYMENT AREAS AT 3500 MHz***Z. A. Shamsan and T. A. Rahman*

1	Introduction . . . . .	170
2	Vision for IMT-advanced System Concept . . . . .	171
3	Coexistence Model . . . . .	172
4	Wave Propagation Model . . . . .	173
5	Coexistence Scenarios, Parameters and Assumptions . . . . .	174
6	Coexistence Results and Discussions . . . . .	175
7	Conclusions . . . . .	183

**BANDWIDTH ENHANCEMENT AND FURTHER SIZE REDUCTION OF A CLASS OF ELLIPTIC-FUNCTION LOW-PASS FILTER USING MODIFIED HAIRPIN RESONATORS***M. Nosrati and A. Najafi*

1	Introduction . . . . .	187
2	The Stepped-impedance Modified-hairpin Resonator . . . . .	189



3 Multiple Cascaded Low-pass Filter ..... 190  
 4 Conclusion ..... 192

**REGULARIZED OPTIMUM BEAMFORMING FOR  
 DOWNLINK CDMA SYSTEMS**

*N. A. Odhah, K. H. Awadallah, M. I. Dessouky, and F. E. Abd  
 El-Samie*

1 Introduction ..... 196  
 2 Beamforming ..... 198  
 3 Linear Equalization ..... 199  
 4 The Proposed Scheme ..... 200  
 5 Simulation Results ..... 203  
 6 Conclusions ..... 206