

CONTENTS

Series Editor's Foreword	ix
Preface	xi
Contents by Author	xiii
Introduction	1
PART I: WALSH SIGNAL DEFINITION AND GENERATION	
Editor's Comments on Papers 1, 2, and 3	4
1 HARMUTH, H. F.: A Generalized Concept of Frequency and Some Applications <i>IEEE Trans. Inf. Theory</i> IT-14 :375-382 (1968)	6
2 AHMED, N., H. H. SCHREIBER, and P. V. LOPRESTI: On Notation and Definition of Terms Related to a Class of Complete Orthogonal Functions <i>IEEE Trans. Electromagn. Compat.</i> EMC-15 :75-80 (1973)	14
3 GAUBATZ, D. A., and R. KITAI: A Programmable Walsh Function Generator for Orthogonal Sequence Pairs <i>IEEE Trans. Electromagn. Compat.</i> EMC-16 :134-136 (1974)	20
PART II: WALSH TRANSFORM COMPUTATION	
Editor's Comments on Papers 4, 5, and 6	24
4 CARL, J. W., and R. V. SWARTWOOD: A Hybrid Walsh Transform Computer <i>IEEE Trans. Comput.</i> C-22 :669-672 (1973)	27
5 FRANGAKIS, G., and S. TZAFESTAS: A Digital Walsh Function Analyser <i>Electron. Eng.</i> , July, pp. 89-91 (1979)	31
6 MUNIAPPAN, K., and R. KITAI: Microprocessor-Based Walsh-Fourier Spectral Analyzer <i>IEEE Trans. Instrum. Meas.</i> IM-28 :295-299 (1979)	34
PART III: DYNAMIC SYSTEMS ANALYSIS	
Editor's Comments on Papers 7 Through 10	40
7 CHEN, C. F., Y. T. TSAY, and T. T. WU: Walsh Operational Matrices for Fractional Calculus and Their Application to Distributed Systems <i>J. Franklin Inst.</i> 303 :267-284 (1977)	42

Contents

- 8** SHIH, Y.-P., and J.-Y. HAN: Double Walsh Series Solution of First-Order Partial Differential Equations **60**
Int. J. Syst. Sci. **9**:569-578 (1978)
- 9** CHEN, W.-L.: Walsh Series Analysis of Multi-delay Systems **70**
J. Franklin Inst. **313**:207-217 (1982)
- 10** MAQUSI, M.: On the Walsh Analysis of Nonlinear Systems **81**
IEEE Trans. Electromagn. Compat. **EMC-20**:519-523 (1978)

PART IV: SYSTEM IDENTIFICATION

- Editor's Comments on Papers 11 Through 15** **88**
- 11** CHEN, C. F., and C. H. HSIAO: Time-Domain Synthesis Via Walsh Functions **90**
IEE Proc. **122**:565-570 (1975)
- 12** KARANAM, V. R., P. A. FRICK, and R.R. MOHLER: Bilinear System Identification by Walsh Functions **96**
IEEE Trans. Autom. Control **AC-23**:709-713 (1978)
- 13** TZAFESTAS, S. G.: Walsh Series Approach to Lumped and Distributed System Identification **102**
J. Franklin Inst. **305**:199-220 (1978)
- 14** MAQUSI, M.: Identification of Volterra Kernels of a Class of Nonlinear Systems by Walsh Function Techniques **124**
J. Franklin Inst. **310**:65-75 (1980)
- 15** PRASADA RAO, G., and K. R. PALANISAMY: Improved Algorithms for Parameter Identification in Continuous Systems Via Walsh Functions **135**
IEE Proc. **130**:9-16 (1983)

PART V: OPTIMAL OBSERVER, FILTER, AND CONTROLLER DESIGN

- Editor's Comments on Papers 16 Through 22** **144**
- 16** CHEN, C. F., and C. H. HSIAO: Design of Piecewise Constant Gains for Optimal Control Via Walsh Functions **147**
IEEE Trans. Autom. Control **AC-20**:596-602 (1975)
- 17** STAVROULAKIS, P., and S. TZAFESTAS: A Walsh Series Approach to Time-Delay Control System Observer Design **154**
Int. J. Syst. Sci. **9**:287-299 (1978)
- 18** TZAFESTAS, S., and P. STAVROULAKIS: A Method for Suboptimal Control of Time-varying Systems **167**
J. Franklin Inst. **305**:293-305 (1978)
- 19** STAVROULAKIS, P., and S. TZAFESTAS: Walsh Series Approach to Observer and Filter Design in Optimal Control Systems **180**
Int. J. Control **26**:721-736 (1977)
- 20** STAVROULAKIS, P., and S. TZAFESTAS: Distributed-Parameter Observer-Based Control Implementation Using Finite Spatial Measurements **196**
Math. Computers Simulation **22**:373-379 (1980)
- 21** TZAFESTAS, S., and N. CHRYSOCHOIDES: Nuclear Reactor Control Using Walsh Function Variational Synthesis **203**
Nucl. Sci. Eng. **62**:763-770 (1977)

22	PALANISAMY, K. R., and G. PRASADA RAO: Optimal Control of Linear Systems with Delays in State and Control Via Walsh Functions <i>IEE Proc.</i> 130 :300-312 (1983)	211
PART VI: BLOCK-PULSE FUNCTIONS		
Editor's Comments on Papers 23 Through 27		226
23	SANNUTI, P.: Analysis and Synthesis of Dynamic Systems Via Block-Pulse Functions <i>IEE Proc.</i> 124 :569-571 (1977)	228
24	PRASADA RAO, G., and T. SRINIVASAN: Analysis and Synthesis of Dynamic Systems Containing Time Delays Via Block-Pulse Functions <i>IEE Proc.</i> 125 :1064-1068 (1978)	231
25	SHIH, Y.-P., C. HWANG, and W.-K. CHIA: Parameter Estimation of Delay Systems Via Block Pulse Functions <i>J. Dyn. Syst., Meas., Control</i> 102 :159-162 (1980)	236
26	KWONG, C. P., and C. F. CHEN: Linear Feedback System Identification Via Block-Pulse Functions <i>Int. J. Syst. Sci.</i> 12 :635-642 (1981)	240
27	RAO, V. P., and K. R. RAO: Optimal Feedback Control Via Block-Pulse Functions <i>IEEE Trans. Autom. Control</i> AC-24 :372-374 (1979)	248
PART VII: MISCELLANEOUS PROPERTIES: WALSH-TO-FOURIER CONVERSION		
Editor's Comments on Papers 28 Through 31		252
28	BLACHMAN, N. M.: Sinusoids versus Walsh Functions <i>IEEE Proc.</i> 62 :346-354 (1974)	256
29	SIEMENS, K. H., and R. KITAI: A Nonrecursive Equation for the Fourier Transform of a Walsh Function <i>IEEE Trans. Electromagn. Compat.</i> EMC-15 :81-83 (1973)	265
30	KITAI, R.: Walsh-to-Fourier Spectral Conversion for Periodic Waves <i>IEEE Trans. Electromagn. Compat.</i> EMC-17 :266-269 (1975)	268
31	KITAI, R.: Synthesis of Periodic Sinusoids from Walsh Waves <i>IEEE Trans. Instrum. Meas.</i> IM-24 :313-317 (1975)	272
PART VIII: WALSH TRANSFORM APPLICATIONS		
Editor's Comments on Papers 32 Through 38		278
32	LARSEN, H., and D. C. LAI: Walsh Spectral Estimates with Applications to the Classification of EEG Signals <i>IEEE Trans. Biomed. Eng.</i> BME-27 :485-492 (1980)	282
33	KUKLINSKI, W. S.: Fast Walsh Transform Data-Compression Algorithm: E.C.G. Applications <i>Med. Biol. Eng. Comput.</i> 21 :465-472 (1983)	290
34	PRATT, W. K., J. KANE, and H. C. ANDREWS: Hadamard Transform Image Coding <i>IEEE Proc.</i> 57 :58-68 (1969)	298

Contents

35	FRANGOULIS, E., and L. F. TURNER: Hadamard-Transformation Technique of Speech Coding: Some Further Results <i>IEE Proc.</i> 124 :845-852 (1977)	309
36	TZAFESTAS, S., and G. FRANGAKIS: A Fast Digital Walsh-Hadamard Signal Processing System <i>Math. Computers Simulation</i> 23 :163-169 (1981)	317
37	HARMUTH, H. F., H. C. ANDREWS, and K. SHIBATA: Two-Dimensional Sequency Filters <i>IEEE Trans. Commun.</i> COM-20 :321-331 (1972)	324
38	HURST, S. L.: The Application of Chow Parameters and Rademacher- Walsh Matrices in the Synthesis of Binary Functions <i>Computer J.</i> 16 :165-173 (1973)	335
	Author Citation Index	345
	Subject Index	349
	About the Editor	351