

Prof. Géza Kolumbán

Fellow of IEEE

D.Sc., Dr.habil, C.Sc., Ph.D., M.Sc.

<http://users.itk.ppke.hu/~kolumban>

September 26, 2016

LIST OF PUBLICATIONS

(Publications written in Hungarian are not included)

Edited Special Issues and NDES Proceedings

- [1] G. Kolumbán, guest editor. Special issue on “Intelligent Systems, INTER–ACADEMIA.” *Periodica Polytechnica, Electrical Engineering*, vol. 50, no. 3–4, 2006.
- [2] C. K. Tse, G. Kolumbán and F. C. M. Lau, guest editors. Special Issue on “Application of Chaos in Communications.” *Circuits, Systems and Signal Processing*, vol. 24, no. 5, September–October 2005.
- [3] M. P. Kennedy and G. Kolumbán, guest editors. Special issue on “Noncoherent Chaotic Communications.” *IEEE Trans. Circuits and Syst. I*, vol. 47, no. 12, December 2000.
- [4] G. Kolumbán, editor. *Proc. of the 6th International Specialist Workshop on Nonlinear Dynamics of Electronic Systems, (NDES’98)*. Technical University of Budapest, Budapest, Hungary, July 16–18, 1998.

Book chapters

- [1] G. Kolumbán, T. Krébesz, C. K. Tse and F. C. M. Lau, “Basics of Communications Using Chaos,” in *Chaotic Signals in Digital Communications*, M. Eisencraft, R. Attux and R. Suyama, Eds., chap. 4, pp. 111–142. CRC Press, Taylor & Francis Group, LLC, 2013.
- [2] G. Kolumbán and T. Krébesz, “Chaotic Communications with Autocorrelation Receiver: Modeling, Theory and Performance Limits,” in *Intelligent Computing Based on Chaos*, L. Kocarev, Z. Galias and S. Lian, Eds., chap. 6, pp. 121–143. Springer-Verlag, Berlin Heidelberg, 2009.
- [3] G. Kolumbán, “Phase-Locked Loops,” in *The Encyclopedia of RF and Microwave Engineering*, K. Chang, Ed., vol. 4, pp. 3735–3767. Wiley, New York, 2005.
- [4] G. Kolumbán and M. P. Kennedy, “Correlator-Based Chaotic Communications: Attainable Noise and Multipath Performance,” in *Chaos in Circuits and Systems*, G. Chen and T. Ueta, Eds. World Scientific, Series on Nonlinear Science, Series B –vol. 11, pp. 443–485, Singapore, 2002.
- [5] G. Kolumbán and M. P. Kennedy, “Overview of Digital Communications,” in *Chaotic Electronics in Telecommunications*, M. P. Kennedy, R. Rovatti, and G. Setti, Eds., pp. 131–149. CRC Press LLC, Florida, 2000.

- [6] M. P. Kennedy, G. Kolumbán, and Z. Jákó, “Chaotic Modulation Schemes,” in *Chaotic Electronics in Telecommunications*, M. P. Kennedy, R. Rovatti, and G. Setti, Eds., pp. 151–183. CRC Press LLC, Florida, 2000.
- [7] G. Kolumbán, M. P. Kennedy, and G. Kis, “Performance Evaluation of FM-DCSK,” in *Chaotic Electronics in Telecommunications*, M. P. Kennedy, R. Rovatti, and G. Setti, Eds., pp. 185–220. CRC Press LLC, Florida, 2000.
- [8] G. Kolumbán, “Phase-Locked Loops,” in *The Encyclopedia of Electrical and Electronics Engineering*, J. G. Webster, Ed., vol. 16, pp. 158–188. Wiley, New York, 1999.
- [9] M. P. Kennedy and G. Kolumbán, “Digital Communications Using Chaos,” in *Controlling Chaos and Bifurcations in Engineering Systems*, G. Chen, Ed., chapter 22, pp. 477–500. CRC Press LLC, Florida, 1999.
- [10] M. P. Kennedy and G. Kolumbán, “Communicating with Chaos,” in *The Electrical Engineering Handbook, CRCnetBASE CD*, R. C. Dorf, Ed., chapter 5.4, 16 pages. Chapman & Hall / CRCnetBASE, CRC Press LLC, Florida, 1999.

Refereed international journal papers

- [1] G. Kolumbán, “Software Defined Electronics: A Revolutionary Change in Design and Teaching Paradigm of RF Radio Communications Systems,” *ICT Express*, vol. 1, iss. 1, pp. 44-54, June 2015. Published online in ScienceDirect, Hosted by Elsevier: ‘<http://www.sciencedirect.com/science/article/pii/S2405959515300217>’, DOI: 10.1016/S2405-9595(15)30021-7.
- [2] Cs. M. Józsa, G. Kolumbán, A. M. Vidal, F. J. Martínez-Zaldívar and A. González, “Parallel Sphere Detector Algorithm Providing Optimal MIMO Detection on Massively Parallel Architectures,” *Concurrency and Computation: Practice and Experience*, April 30, 2015. Published online in Wiley Online Library: ‘<http://onlinelibrary.wiley.com/doi/10.1002/cpe.3488/abstract>’, DOI: 10.1002/cpe.3488.
- [3] W. K. Xu, L. Wang and G. Kolumbán, “A New Data Rate Adaption Communications Scheme for Code-Shifted Differential Chaos Shift Keying Modulation,” *International Journal of Bifurcation and Chaos*, vol. 22, no. 8, pp. 1250201/1–1250201/8, August 2012.
- [4] G. Kolumbán, T. Krébesz and F. C. M. Lau, “Theory and Application of Software Defined Electronics: Design Concepts for the Next Generation of Telecommunications and Measurement Systems,” *IEEE CAS Magazine*, vol. 12, no. 2, pp. 8–34, Second Quarter, 2012, invited paper.
- [5] W. K. Xu, L. Wang and G. Kolumbán, “A Novel Differential Chaos Shift Keying Modulation Scheme,” *International Journal of Bifurcation and Chaos*, vol. 21, no. 3, pp. 799–811, March 2011.
- [6] J. Julow, Zs. Kolumbán, Á. Viola, T. Major, and G. Kolumbán, “Prediction of Volumetric Change in the “Triple Ring” Caused by Glioma I-125 Brachytherapy,” *Neuro-Oncology*, vol. 10, no. 4, pp. 583–592, August 2008.
- [7] G. Kolumbán and T. Krébesz, “UWB Radio: Digital Communication with Chaotic and Impulse Wavelets,” *IEICE Trans. on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E90-A, no. 10, pp. 2248–2249, October 2007.

- [8] S. K. Yong, C. C. Chong, and G. Kolumbán, “Non-Coherent UWB Radio for Low-Rate WPAN Applications: A Chaotic Approach,” *International Journal of Wireless Information Networks*, vol. 14, no. 2, pp. 121–131, June 2007.
- [9] Y. Xia, C. K. Tse, F. C. M. Lau and G. Kolumbán, “Performance of Frequency-Modulated Differential-Chaos-Shift-Keying Communication System Over Multipath Fading Channels with Delay Spread,” *International Journal of Bifurcation and Chaos*, vol. 15, no. 12, pp. 4027–4033, December 2005.
- [10] G. Kolumbán, F. C. M. Lau and C. K. Tse, “Generalization of Waveform Communications: The Fourier Analyzer Approach,” *Circuits, Systems and Signal Processing*, vol. 24, no. 5, pp. 451–477, September–October 2005.
- [11] F. C. M. Lau and G. Kolumbán, “Performance Limit of Chaotic Digital Waveform Communication Systems: Approach of Maximizing A Posteriori Probability,” *Circuits, Systems and Signal Processing*, vol. 24, no. 5, pp. 639–655, September–October 2005.
- [12] Z. Szabó and G. Kolumbán, “How to Avoid False Lock in SPLN Frequency Synthesizers,” *IEEE Trans. on Instrumentation and Measurement*, vol. 52, no. 3, pp. 927–931, June 2003.
- [13] G. Kolumbán, M. P. Kennedy, Z. Jákó, and G. Kis, “Chaotic Communications with Correlator Receiver: Theory and Performance Limit,” *Proceedings of the IEEE*, vol. 90, no. 5, pp. 711–732, May 2002, invited paper.
- [14] G. Kolumbán and M. P. Kennedy, “The Role of Synchronization in Digital Communication Using Chaos—Part III: Performance Bounds,” *IEEE Trans. Circuits and Syst. I*, vol. 47, no. 12, pp. 1673–1683, December 2000.
- [15] G. Kolumbán, “Theoretical Noise Performance of Correlator-Based Chaotic Communications Schemes,” *IEEE Trans. Circuits and Syst. I*, vol. 47, no. 12, pp. 1692–1701, December 2000.
- [16] M. P. Kennedy, G. Kolumbán, G. Kis, and Z. Jákó, “Performance Evaluation of FM-DCSK Modulation in Multipath Environments,” *IEEE Trans. Circuits and Syst. I*, vol. 47, no. 12, pp. 1702–1711, December 2000.
- [17] Z. Jákó, G. Kolumbán, and H. Dedieu, “On Some Recent Developments of Noise Cleaning Algorithms for Chaotic Signals,” *IEEE Trans. Circuits and Syst. I*, vol. 47, no. 9, pp. 1403–1407, September 2000.
- [18] M. P. Kennedy and G. Kolumbán, “Digital Communications Using Chaos,” *Signal Processing*, vol. 80, no. 7, pp. 1307–1320, July 2000.
- [19] M. P. Kennedy, G. Kolumbán, and G. Kis, “Chaotic Modulation for Robust Digital Communications over Multipath Channels,” *International Journal of Bifurcation and Chaos*, vol. 10, no. 4, pp. 695–718, April 2000, invited paper.
- [20] B. A. Frigyük and G. Kolumbán, “Phenomenological Model of the Sampling Phase-Locked Loop with False Lock,” *Journal of Signal Processing*, Special Issue on Nonlinear Signal Processing, vol. 4, pp. 99–103, January 2000.
- [21] G. Kolumbán, M. P. Kennedy, and L. O. Chua, “The Role of Synchronization in Digital Communication Using Chaos—Part II: Chaotic Modulation and Chaotic Synchronization,” *IEEE Trans. Circuits and Syst. I*, vol. 45, no. 11, pp. 1129–1140, November 1998.

- [22] G. Kolumbán, G. Kis, Z. Jákó, and M. P. Kennedy, “FM-DCSK: A Robust Modulation Scheme for Chaotic Communications,” *IEICE Trans. Fundamentals of Electronics, Communications and Computer Sciences*, vol. E81–A, no. 9, pp. 1798–1802, September 1998.
- [23] B. Vizvári and G. Kolumbán, “Quality Evaluation of Random Numbers Generated by Chaotic Sampling Phase-Locked Loops,” *IEEE Trans. Circuits and Syst. I*, vol. 45, no. 3, pp. 216–224, March 1998.
- [24] G. Kolumbán, M. P. Kennedy, and L. O. Chua, “The Role of Synchronization in Digital Communication Using Chaos—Part I: Fundamentals of Digital Communications,” *IEEE Trans. Circuits and Syst. I*, vol. 44, no. 10, pp. 927–936, October 1997.
- [25] G. Kolumbán and B. Vizvári, “Nonlinear Dynamics and Chaotic Behavior of the Sampling Phase-Locked Loop,” *IEEE Trans. Circuits and Syst. I*, vol. 41, no. 4, pp. 333–337, April 1994.

Patents Granted

- [1] G. Kolumbán, M. P. Kennedy, G. Kis, and Z. Jákó, “Binary Digital Communication System Using a Chaotic Frequency-Modulated Carrier,” Irish patent number: S80913, granted on June 16, 1999.
- [2] G. Kolumbán, G. Szarka and M. Krasovics, “Phase Detector and Frequency Synthesizer Configurations for Single Channel per Carrier-Type Satellite Communications Systems,” Hungarian patent number: 205-505, granted on October 26, 1988.
- [3] G. Kolumbán, M. Krasovics, and G. Szarka, “Lock Indicator Configuration for Phase-Locked Loops Operating over Very Wide Region of Phase Error,” Hungarian patent number: 204-940, granted on April 6, 1988.
- [4] G. Kolumbán, I. Sal, S. Király, G. Kósa, and K. Visegrádi, “AFC Circuit Configuration for Quartz-Stable Microwave Local Oscillator with FM Modulation Capability,” Hungarian patent number: 181-811, granted on June 9, 1980.
- [5] I. Sal and G. Kolumbán, “Circuit Configuration for Quartz Oscillator with Extremely High Stability and Spectral Purity,” Hungarian patent number: 174-247, granted on August 5, 1977.
- [6] V. Bíró, G. Kolumbán, and K. Visegrádi, “Circuit Configuration for Stabilizing the Output Power of Microwave Frequency Multipliers,” Hungarian patent number: 174-248, granted on June 8, 1977.

Invited tutorials and keynote addresses

- [1] G. Kolumbán, “University Ivory Tower: To Stay in or Break Out, SDE: A Direct Jump from Scientific Research to Industrial Applications,” invited plenary talk at *2015 International Symposium on Nonlinear Theory and its Applications*, Hong Kong SAR, China, December 1–4, 2015, in *Proc. NOLTA’15*, pp. 756–768.
- [2] G. Kolumbán, “New Approach for Design and Implementation of Future Communications Systems,” invited keynote speech at *2014 International Symposium on System-on-Chip (SoC)*, October 28, 2014, Tampere, Finland.

- [3] G. Kolumbán, “Software Defined Electronics (SDE): A Revolutionary Change in Design Paradigm of RF Radio and Measurement Systems,” invited plenary talk at *14th International Symposium on Communications and Information Technologies (ISCIT)*, September 24, 2014, Incheon, Korea.
- [4] G. Kolumbán, “Software Defined Electronics: A Revolutionary Change in Design Paradigm of RF Radio and Measurement Systems,” invited tutorial at *International Telecommunications Symposium (ITS)*, August 17, 2014, São Paulo, Brazil.
- [5] G. Kolumbán, “Software Defined Electronics: A New Research Field for Circuits and Systems Society,” invited keynote talk at *12th IEEE International New Circuits And Systems (NEWCAS) Conference*, June 24, 2014, Trois-Rivières, Canada.
- [6] G. Kolumbán, “SDE: A Revolutionary New Approach for Design and Implementation of Future Communications Systems,” invited keynote talk at *IEEE International Symposium on Computer, Consumer and Control (IS3C)*, June 10, 2014, Taichung, Taiwan.
- [7] G. Kolumbán, F. C. M. Lau and C. K Tse, “UWB Radio: From an Idea to Implementations,” invited tutorial at *2010 IEEE International Conference on Ultra-Wideband (ICUWB)*, Nanjing, China, September 20–23, 2010.
- [8] G. Kolumbán, “Feasibility of UWB radio: Dreams, Facts and Solutions,” invited speech at *IEEE International Symposium on Communications and Information Technologies (ISCIT)*, Incheon, Korea, September 28–30, 2009.
- [9] G. Kolumbán and T. Krébesz, “LR-WPAN and UWB Data Communication Systems: A New Possible Application for Chaotic Carriers,” invited talk at *International Workshop on Nonlinear Maps and their Applications (NOMA)*, University de Toulouse, LATTIS–INSA Toulouse, France, December 13–14, 2007, in *Proc. NOMA’07*, pp. 32–35.
- [10] G. Kolumbán, “Performance Bounds on Chaos Communications: A Systematic Approach to the Development of a Chaotic Communication System,” keynote talk at *Workshop on the Transmission of Chaotic Signals*, University of Bristol, UK, August 1–3, 2006.
- [11] G. Kolumbán, “Ultra-Wideband Radio: Chaotic Communications versus Noncoherent Impulse Radio,” invited tutorial at *European Conference on Circuit Theory and Design (ECTD)*, University College Cork, Ireland, September 1–2, 2005.
- [12] G. Kolumbán, “The Theory and Implementation of a Robust Chaotic Digital Communications System,” invited tutorial at *2003 Microwave Symposium Workshop* organized at IEEE International Microwave Symposium, Philadelphia, USA, June 9, 2003, online: “<http://www.ims2003.org/technical/workshop/WMA.htm>”.
- [13] G. Kolumbán, “The Theory and Implementation of a Robust Chaotic Digital Communications System,” invited talk at *Winter School 2002* organized by the UCSD/UCLA/Stanford ARO MURI Program in Chaotic Communications, University of California, San Diego, USA, January 13–16, 2002, online: “<http://rfic.ucsd.edu/chaos/ws2002/Kolumban.pdf>”.
- [14] M. P. Kennedy and G. Kolumbán, “Chaotic Modulations: From BCSK to FM-DCSK,” presymposium tutorial at *IEEE International Symposium on Circuits and Systems (ISCAS)*, Geneva, Switzerland, May 28–31, 2000.

- [15] G. Kolumbán and M. P. Kennedy, “DCSK: Chaotic Modulation for Multipath Environments,” presymposium tutorial at *IEEE International Symposium on Circuits and Systems (ISCAS)*, Geneva, Switzerland, May 28–31, 2000.
- [16] G. Kolumbán and M. P. Kennedy, “Performance Comparison of FM-DCSK and Conventional Modulation Schemes in Multipath Environment,” invited keynote address at *Nonlinear Dynamics of Electronic Systems (NDES)*, Rønne, Island of Bornholm, Denmark, July 15–17, 1999, in *Proc. NDES’99*, pp. 151–156.
- [17] G. Kolumbán, “Performance Evaluation of Chaotic Communications Systems: Determination of Low-Pass Equivalent Model,” invited tutorial at *Nonlinear Dynamics of Electronic Systems (NDES)*, Budapest, Hungary, July 16–18, 1998, in *Proc. NDES’98*, pp. 41–51.

Invited DLP lectures delivered in the framework of IEEE CAS Distinguished Lecturer Program, 2013-14

- [1] G. Kolumbán, “Software Defined Electronics: A Revolutionary New Approach for the Design and Implementation of Future RF Band-Pass Systems,” Short DLP course at Beijing Jiaotong University, December 2014, Beijing, China.
- [2] G. Kolumbán, “Software-Defined Electronics: A New Research Field for CAS Society,” Half-day DLP tutorial at *NORCHIP 2014*, October 27, 2014, Tampere, Finland.
- [3] G. Kolumbán, “Software Defined Electronics: A Revolutionary New Paradigm for the Research and Design of Future Communications and Measurement Systems,” DLP seminar at City University of Hong Kong and The Hong Kong Polytechnic University, October 10, 2014, Hong Kong.
- [4] G. Kolumbán, “Software Defined Electronics (SDE): A Revolutionary Change in Design Paradigm of Radio and RF Measurement Systems,” Short DLP course at Inha University, September 23, 2014, Incheon, Korea.
- [5] G. Kolumbán, “Software Defined Electronics (SDE): A New Approach for Design and Implementation of Future Communications Systems,” Short DLP course at Universidade do Estado do Rio de Janeiro (UERJ), August 15, 2014, Rio de Janeiro, Brazil.
- [6] G. Kolumbán, “New Approach for Design and Implementation of Future Communications Systems,” DLP lecture at Tokyo University of Science, December 13, 2013, Tokyo, Japan.
- [7] G. Kolumbán, “Software Defined Electronics: A New Research Field for CAS Society,” DLP lecture at Meiji University, December 11, 2013, Tokyo, Japan.
- [8] G. Kolumbán, “Software Defined Electronics: A New Research Field for CAS Society,” DLP lecture at Tokushima University, December 04, 2013, Tokushima, Japan.
- [9] G. Kolumbán, “Implementation of SDE-Based Universal RF Testbed and Derivation of Baseband Equivalents,” DLP lecture *CAMTA Day*, Facultad Regional Buenos Aires - Universidad Tecnológica Nacional, Buenos Aires, August 15, 2013 Buenos Aires, Argentina.
- [10] G. Kolumbán, “Software Defined Electronics: A New Approach for Design and Implementation of Future Communications Systems,” DLP short course at *EAMTA*, Facultad Regional Buenos Aires - Universidad Tecnológica Nacional, August 12 and 14, 2013, Buenos Aires, Argentina.

- [11] G. Kolumbán, “Software Defined Electronics: A Revolutionary Design Paradigm for Automated Calibration and Test Systems,” DLP seminar at Beijing Jiaotong University, May 12, 2013, Beijing, China.
- [12] G. Kolumbán, “Software Defined Electronics: A Revolutionary Paradigm for RF Radio and Measurement Systems,” A day-long DLP short course organized by IEEE UK&RI Solid State Circuits Chapter, Tyndall National Institute, May 09, 2013, Cork, Ireland.
- [13] G. Kolumbán, “Software Defined Electronics: A New Research Field for the IEEE CAS Society” DLP seminar at Guangdong University of Technology, April 09, 2013, Guangzhou, China.

IEEE Conferences

- [1] T. Krébesz, G. Kolumbán, F. C. M. Lau and C. K. Tse, “From Simulations to Field Tests: PXI-Based Software Defined Wireless Platform for Performance Evaluation of FM-DCSK,” in *Proc. IEEE-MWSCAS’13*, Columbus, OH, USA, August 4–7, 2013, pp. 1267–1270.
- [2] G. Kolumbán, T. Krébesz, C. K. Tse and F. C. M. Lau, “Improving the Coverage of Ultra Wideband Impulse Radio by Pulse Compression,” in *Proc. IEEE-ISCAS’12*, COEX, Seoul, Korea, May 20–23, 2012.
- [3] T. Krébesz, G. Kolumbán, and Cs. Józsa, “Exploiting Pulse Compression to Generate an IEEE 802.15.4a-Compliant UWB IR Pulse with Increased Energy Per Bit,” in *Proc. IEEE-ICUWB’11*, Bologna, Italy, September 14–16 2011, pp. 430–434.
- [4] T. Krébesz, G. Kolumbán, F. C. M. Lau, and C. K. Tse, “Performance Improvement of Autocorrelation Detector Used in UWB Impulse Radio,” in *Proc. IEEE-ISCAS’10*, Paris, France, May 30–June 2, 2010, pp. 3761–3764.
- [5] G. Kolumbán, T. Krébesz, and F. C. M. Lau, “Feasibility of UWB Radio: Impulse Radio versus Chaos-Based Approach,” in *Proc. IEEE-ISCAS’10*, Paris, France, May 30–June 2, 2010, pp. 2450–2453.
- [6] T. Krébesz, G. Kolumbán, F. C. M. Lau, and C. K. Tse, “Gated Threshold Compensated Noncoherent PPM Receiver for UWB Impulse Radio,” in *Proc. IEEE-ISCAS’10*, Paris, France, May 30–June 2, 2010, pp. 1097–1100.
- [7] G. Kolumbán, T. Krébesz, C. K. Tse, and F. C. M. Lau, “Derivation of Circuit Specification for the UWB Impulse Radio Transceivers,” in *Proc. IEEE-ISCAS’10*, Paris, France, May 30–June 2, 2010, pp. 337–340.
- [8] T. Krébesz, G. Kolumbán, F. C. M. Lau and C. K. Tse, “Performance Improvement of UWB Autocorrelation Receivers by Minimizing the Energy Capture Time,” in *Proc. IEEE-ICECS’09*, Yasmine Hammamet, Tunisia, December 13–16, 2009, pp. 1020–1023.
- [9] G. Kolumbán, G. Kis, F. C. M. Lau and C. K. Tse, “Optimum Noncoherent FM-DCSK Detector: Application of Chaotic GML Decision Rule,” in *Proc. IEEE-ISCAS’04*, Vancouver, Canada, May 23–26, 2004, pp. 597–600.
- [10] Z. Szabó and G. Kolumbán, “How to Avoid False Lock in SPLL Frequency Synthesizers,” in *Proc. IEEE-IMTC’01*, Budapest, Hungary, May 21–23, 2001, vol. II, pp. 738–743.

- [11] G. Kolumbán and M. P. Kennedy, “Recent Results for Chaotic Modulation Schemes,” in *Proc. IEEE-ISCAS’01*, Sydney, Australia, May 6–9, 2001, vol. III, pp. 141–144.
- [12] G. Kolumbán and G. Kis, “Multipath Performance of FM-DCSK Chaotic Communication System,” in *Proc. IEEE-ISCAS’00*, Geneva, Switzerland, May 28–31, 2000, vol. IV, pp. 433–436.
- [13] G. Kolumbán, B. A. Frigyik, and M. P. Kennedy, “Frequency Domain Analysis of Double Sampling Phase-Locked Loop,” in *Proc. IEEE-ISCAS’00*, Geneva, Switzerland, May 28–31, 2000, vol. V, pp. 269–272.
- [14] B. A. Frigyik and G. Kolumbán, “Phenomenological Model of False Lock in the Sampling Phase-Locked Loop,” in *Proc. IEEE-ISCAS’00*, Geneva, Switzerland, May 28–31, 2000, vol. V, pp. 273–276.
- [15] M. P. Kennedy, G. Kolumbán, and G. Kis, “Simulation of the Multipath Performance of FM-DCSK Digital Communications Using Chaos,” in *Proc. IEEE-ISCAS’99*, Orlando, USA, May 30–June 2, 1999, vol. IV, pp. 568–571.
- [16] G. Kolumbán, Z. Jákó, and M. P. Kennedy, “Enhanced Version of DCSK and FM-DCSK Data Transmission Systems,” in *Proc. IEEE-ISCAS’99*, Orlando, USA, May 30–June 2, 1999, vol. IV, pp. 475–478.
- [17] M. P. Kennedy, G. Kolumbán, G. Kis, and Z. Jákó, “Recent Advances in Communicating with Chaos,” in *Proc. IEEE-ISCAS’98*, Monterey, USA, May 31–June 3, 1998, pp. 461–464.
- [18] G. Kolumbán, M. P. Kennedy, G. Kis, and Z. Jákó, “FM-DCSK: A Novel Method for Chaotic Communications,” in *Proc. IEEE-ISCAS’98*, Monterey, USA, May 31–June 3, 1998, vol. IV, pp. 477–480.
- [19] G. Kolumbán, A. Hasegawa, T. Endo, and G. Kis, “Direct Signal Generation for Chaos Communication and Chaotic Measurement by Analog PLL,” in *Proc. IEEE-ISCAS’97*, Hong Kong, June 9–12, 1997, vol. II, pp. 901–904.
- [20] G. Kolumbán, B. Vizvári, A. Mögel, and W. Schwarz, “Chaotic Systems: A Challenge for Measurement and Analysis,” in *Proc. IEEE-IMTC’96*, Brussels, Belgium, June 4–6, 1996, pp. 1396–1401.
- [21] G. Kolumbán, “Frequency Domain Analysis of Sampling Phase-Locked Loops,” in *Proc. IEEE-ISCAS’88*, Helsinki-Espoo, Finland, June 1988, pp. 611–614.

Other International Conferences

- [1] G. Kolumbán and T. Krébesz, “Determination of Emission Limits of UWB Impulse Radio Systems,” in *Proc. NOLTA’15*, Hong Kong, December 1–4, 2015, pp. 872–875.
- [2] G. Kolumbán, T. Krébesz, F. C. M. Lau and C. K. Tse, “Turn Your Baseband Matlab Simulator into a Fully Functional, 2.4-GHz, Operating FM-DCSK Transceiver Using SDE Platform,” in *Proc. ECCTD’13*, Dresden, Germany, September 8–12, 2013, 4 pages.
- [3] T. Krébesz, G. Kolumbán, F. C. M. Lau and C. K. Tse, “Application of Universal Software Defined PXI Platform for the Performance Evaluation of FM-DCSK Communications System,” in *Proc. ECCTD’13*, Dresden, Germany, September 8–12, 2013, 4 pages.

- [4] Cs. M. Józsa, G. Kolumbán, A. M. Vidal, F. M. Zaldívar and A. González, “New Parallel Sphere Detector Algorithm Providing High-Throughput for Optimal MIMO Detection,” in *Procedia Computer Science*, Elsevier, Barcelona, Spain, June 5–7, 2013, vol. 18, pp. 2432–2435.
- [5] G. Kolumbán, T. Krébesz, F. C. M. Lau, and C. K. Tse, “Performance Comparison of UWB Chirp IR TR and UWB FM-DCSK TR Systems Implemented with Autocorrelation Receiver,” in *Proc. NOLTA ’12*, Palma, Majorca, Spain, October 22–26, 2012, pp. 793–796.
- [6] T. Krébesz, G. Kolumbán, C. K. Tse and F. C. M. Lau, “Implementation of FM-DCSK modulation scheme on USRP platform based on complex envelope,” in *Proc. NOLTA ’12*, Palma, Majorca, Spain, October 22–26, 2012, pp. 797–800.
- [7] T. Krébesz, G. Kolumbán, and Cs. M. Józsa, “Ultra-wideband impulse radio based on pulse compression technique,” in *Proc. ECCTD ’11*, Linköping, Sweden, August 29–31, 2011, pp. 826–829.
- [8] T. Krébesz, Cs. M. Józsa, and G. Kolumbán, “New carrier generation techniques and their influence on bit energy in uwb radio,” in *Proc. ECCTD ’11*, Linköping, Sweden, August 29–31, 2011, pp. 830–833.
- [9] G. Kolumbán, T. Krébesz, F. C. M. Lau, and C. K. Tse, “Radio coverage extension of the FCC-compliant low-rate UWB networking devices,” in *Proc. NOLTA ’10*, Cracow, Poland, September 5–8, 2010, pp. 322–325.
- [10] T. Krébesz, G. Kolumbán, C. K. Tse, and F. C. M. Lau, “FCC-compliant operation of low-rate UWB impulse radio applying multiple pulses per bit,” in *Proc. NOLTA ’10*, Cracow, Poland, September 5–8, 2010, pp. 318–321.
- [11] T. Krébesz, G. Kolumbán, C. K. Tse, and F. C. M. Lau, “Improving the noise performance of energy detector based UWB systems by optimizing the receiver parameters,” in *Proc. ISCIT ’09*, Incheon, Korea, September 28–30, 2009, pp. 1426–1430.
- [12] T. Krébesz and G. Kolumbán, “A new, near-coherent detector configuration for UWB impulse radio,” in *Proc. NOLTA ’08*, Budapest, Hungary, September 7–10, 2008, pp. 636–639.
- [13] G. Kolumbán, T. Krébesz, F. C. M. Lau, and C. K. Tse, “A mathematical approach to derive optimum detector configurations for UWB radio applications,” in *Proc. NOLTA ’08*, Budapest, Hungary, September 7–10, 2008, pp. 716–719.
- [14] G. Kolumbán and Tamás Krébesz, “UWB Radio: A real chance for application of chaotic communications,” in *Proc. NOLTA ’06*, Bologna, Italy, September 11–14, 2006, pp. 475–478.
- [15] G. Kolumbán, T. Krébesz and M. Bálint, “Noncoherent UWB impulse radio and FM-DCSK: What makes them different,” in *Proc. NDES ’06*, Dijon, France, June 6–9, 2006, pp. 93–96.
- [16] G. Kolumbán, “Model and unified theory of chaotic communications,” in *Proc. NDES ’05*, Potsdam, Germany, September 18–22, 2005.
- [17] G. Kolumbán, “UWB technology: Chaotic communications versus noncoherent impulse radio,” in *Proc. ECCTD ’05*, Cork, Ireland, August 29–September 2, 2005, pp. 79–82.

- [18] Y. Xia, C. K. Tse, F. C. M. Lau and G. Kolumbán, “Performance of FM-DCSK communication system over a multipath fading channel with delay spread,” in *Proc. NOLTA '04*, Fukuoka, Japan, November 29–December 3, 2004, pp. 685–688.
- [19] G. Kolumbán, F. C. M. Lau, and M. Small, “A new description of chaotic waveform communications: The Fourier analyzer approach,” in *Proc. ECCTD'03*, Cracow, Poland, September 1-4, 2003, vol. III, pp. 241–244.
- [20] G. Kolumbán, “A new frequency-domain FM-DCSK detector,” in *Proc. ECCTD'03*, Cracow, Poland, September 1-4, 2003, vol. III, pp. 253–256.
- [21] G. Kolumbán and G. Kis, “Reception of m -ary FM-DCSK signals by energy detector,” in *Proc. NDES'03*, Scuol, Switzerland, May 18–22, 2003, pp. 133–136.
- [22] G. Kolumbán, Z. Jákó, and G. Kis, “Enhanced versions of the DCSK systems,” in *Proc. NOLTA '00*, Xi'an, China, October 7–11, 2002, pp. 95–98.
- [23] V. Guglielmi, D. Fournier-Prunaret, G. Kolumbán, and Z. Jákó, “Spectral components of chaos,” in *CDROM of GRETSI'01*, Toulouse, France, September 10-13, 2001, paper code: Paper #085.
- [24] G. Kolumbán, “Exact analytical expression for the noise performance of FM-DCSK,” in *Proc. NOLTA '00*, Dresden, Germany, September 17–21, 2000, pp. 735–738.
- [25] G. Kolumbán and M. P. Kennedy, “Double-sampling PLL frequency synthesizer,” in *Proc. ISSC'00*, Dublin, Ireland, June 29–30, 2000, pp. 77–84.
- [26] G. Kolumbán, “FM-DCSK: A noncoherent digital modulation scheme for multipath environments,” in *Proc. ISSC'00*, Dublin, Ireland, June 29–30, 2000, pp. 241–248.
- [27] Z. Jákó, G. Kis, and G. Kolumbán, “Multiple access capability of the FM-DCSK chaotic communications system,” in *Proc. NDES'00*, Catania, Italy, May 18–20, 2000, pp. 52–55.
- [28] G. Kolumbán, “Basis function description of chaotic modulation schemes,” in *Proc. NDES'00*, Catania, Italy, May 18–20, 2000, pp. 165–169.
- [29] D. Gillespie, M. P. Kennedy, and G. Kolumbán, “Improved nonlinear model of a second-order charge-pump PLL,” in *Proc. NDES'00*, Catania, Italy, May 18–20, 2000, pp. 240–243.
- [30] B. A. Frigiyik, Z. Szabó, and G. Kolumbán, “False lock in narrowband sampling phase-locked loop,” in *Proc. NDES'00*, Catania, Italy, May 18–20, 2000, pp. 273–277.
- [31] G. Kolumbán, B. A. Frigiyik, and M. P. Kennedy, “Accurate baseband model for sampling phase-locked loop,” in *Proc. NOLTA '99*, Hawai, USA, November 28–December 2, 1999, pp. 593–596.
- [32] G. Kolumbán, B. A. Frigiyik, and M. P. Kennedy, “Design equations and baseband model for double-sampling phase-locked loop,” in *Proc. IEEE-ICECS'99*, Pafos, Cyprus, September 5–8, 1999, vol. II, pp. 895–898.
- [33] G. Kolumbán, G. Kis, M. P. Kennedy, and G. Baldwin, “Ultra-fast simulator developed in MATLAB environment to evaluate multipath performance of FM-DCSK RF system,” in *Proc. IEEE-ICECS'99*, Pafos, Cyprus, September 5–8, 1999, vol. III, pp. 1725–1728.

- [34] G. Kolumbán and B. A. Frigyik, “Robust chaotic communications without synchronization,” in *Proc. ECCTD’99*, Stresa, Italy, Augustus 29–September 2, 1999, vol. I, pp. 445–448.
- [35] G. Kolumbán, B. A. Frigyik, and M. P. Kennedy, “Nonlinear baseband model for double-sampling phase-locked loop,” in *Proc. NDES’99*, Rønne, Island of Bornholm, Denmark, July 15–17, 1999, pp. 117–120.
- [36] G. Baldwin, M. P. Kennedy, G. Kis, and G. Kolumbán, “FM-DCSK radio system simulator,” in *Proc. ISSC’99*, Galway, Ireland, June 24–25, 1999, pp. 425–432.
- [37] M. P. Kennedy, G. Kolumbán, and G. Kis, “Application of chaotic modulation in multipath environment,” in *Proc. COST 255*, Neuchatel, Switzerland, May 5–7, 1999, p. 13.
- [38] G. Kolumbán, B. A. Frigyik, and M. P. Kennedy, “Accurate baseband model for sampling phase-locked loop,” in *Proc. IEE Colloquium on Phase Lock Loop: Theory and Practice*, London, UK, May 5, 1999, pp. 5/1–5/8.
- [39] G. Kolumbán and G. Kis, “Performance evaluation of FM-DCSK modulation scheme,” in *Proc. NOLTA ’98*, Crans-Montana, Switzerland, September 14–17, 1998, pp. 81–84.
- [40] Z. Jákó and G. Kolumbán, “Carrier generation for chaotic communications by fourth-order analog phase-locked loop,” in *Proc. NOLTA ’98*, Crans-Montana, Switzerland, September 14–17, 1998, pp. 827–830.
- [41] G. Kis and G. Kolumbán, “Constraints on chaotic oscillators intended for communications applications,” in *Proc. NOLTA ’98*, Crans-Montana, Switzerland, September 14–17, 1998, pp. 883–886.
- [42] Z. Jákó, H. Dedieu, and G. Kolumbán, “Improvement of signal-to-noise ratio in chaotic communications systems,” in *Proc. NOLTA ’98*, Crans-Montana, Switzerland, September 14–17, 1998, pp. 1305–1308.
- [43] M. N. Lorenzo, M. P. Kennedy, G. Kolumbán, and G. Kis, “A comparison of the noise performance of Pecora-Caroll and H_∞ synchronization,” in *Proc. NDES’98*, Budapest, Hungary, July 16–18, 1998, pp. 249–252.
- [44] Z. Jákó, G. Kis, G. Kolumbán, and M. P. Kennedy, “Design of large signal set for DCSK modulation,” in *Proc. Sixth IEE Conference on Telecommunications*, Edinburgh, UK, March 29–April 1, 1998, pp. 44–48.
- [45] G. Kis, Z. Jákó, M. P. Kennedy, and G. Kolumbán, “Chaotic communications without synchronization,” in *Proc. Sixth IEE Conference on Telecommunications*, Edinburgh, UK, March 29–April 1, 1998, pp. 49–53.
- [46] G. Kolumbán, G. Kis, M. P. Kennedy, and Z. Jákó, “FM-DCSK: A new and robust solution for chaotic communications,” in *Proc. NOLTA ’97*, Honolulu, USA, November 29–December 2, 1997, pp. 117–120.
- [47] M. P. Kennedy, Z. Jákó, G. Kis, and G. Kolumbán, “Chaotic communications system for unlicensed radio applications,” in *Proc. NOLTA ’97*, Honolulu, USA, November 29–December 2, 1997, pp. 120–124.
- [48] M. P. Kennedy and G. Kolumbán, “Chaos communications: from theory to implementation,” in *Proc. ECCTD’97*, Budapest, Hungary, August 30–September 3, 1997, pp. 272–277.

- [49] G. Kolumbán, M. P. Kennedy, and G. Kis, “Performance improvement of chaotic communications systems,” in *Proc. ECCTD’97*, Budapest, Hungary, August 30–September 3, 1997, pp. 284–289.
- [50] M. P. Kennedy and G. Kolumbán, “Digital communication using chaotic basis functions,” in *Proc. COST 254*, “Emerging Techniques for Communication Terminals”, Toulouse, France, July 7–9, 1997.
- [51] G. Kolumbán, M. P. Kennedy, and G. Kis, “Multilevel differential chaos shift keying,” in *Proc. NDES’97*, Moscow, Russia, June 26–27, 1997, pp. 191–196.
- [52] G. Kolumbán, M. P. Kennedy, and G. Kis, “Determination of symbol duration in chaos-based communications,” in *Proc. NDES’97*, Moscow, Russia, June 26–27, 1997, pp. 217–222.
- [53] K. Watada, T. Endo, and G. Kolumbán, “Shilnikov orbits in an autonomous third-order chaotic phase-locked loop,” in *Proc. NOLTA’96*, Katsurahama-so, Kochi, Japan, October 7–9, 1996, pp. 293–296.
- [54] G. Kolumbán, B. Vizvári, W. Schwarz, and A. Abel, “Differential chaos shift keying: A robust coding for chaos communication,” in *Proc. NDES’96*, Seville, Spain, June 27–28, 1996, pp. 87–92.
- [55] G. Kolumbán, J. Schweizer, J. Ennitis, H. Dedieu, and B. Vizvári, “Performance evaluation and comparison of chaos communication schemes,” in *Proc. NDES’96*, Seville, Spain, June 27–28, 1996, pp. 105–110.
- [56] G. Kolumbán, B. Vizvári, A. Mögel, and W. Schwarz, “Applications of chaotic signals in stochastic measurement,” in *Proc. NDES’96*, Seville, Spain, June 27–28, 1996, pp. 287–292.
- [57] Zs. Bacsı, G. Kolumbán, and B. Vizvári, “Electrical circuits to model problems of economics,” in *Proc. NDES’96*, Seville, Spain, June 27–28, 1996, pp. 293–298.
- [58] G. Kolumbán and B. Vizvári, “Direct symbol generation by PLL for the chaos shift keying modulation,” in *Proc. ECCTD’95*, Istanbul, Turkey, August 27–31, 1995, pp. 483–486.
- [59] G. Kolumbán and B. Vizvári, “Nonlinear dynamics and chaotic behaviour of the analog phase-locked loop,” in *Proc. NDES’95*, Dublin, Ireland, July 1995, pp. 99–102.
- [60] G. Kolumbán and B. Vizvári, “Chaotic circuits and random number generation,” in *Proc. NDES’95*, Dublin, Ireland, July 28–29, 1995, pp. 201–204.
- [61] G. Kolumbán and B. Vizvári, “Acquisition properties and chaotic behaviour of the sampling phase-locked loop,” in *Nonlinear Dynamics of Electronic Systems*, Extended versions of the papers presented at NDES’93, (W. Schwarz and A.C. Davies Editors), Singapore: World Scientific, 1994, pp. 336–349.
- [62] G. Kolumbán and B. Vizvári, “Acquisition properties and chaotic behaviour of the sampling phase-locked loop,” in *Proc. NDES’93*, Dresden, July 23–24, 1993, pp. 54–59.
- [63] G. Kolumbán, “A simple frequency synthesizer configuration for low-capacity digital microwave radio links,” in *Proc. EuMc’91*, Stuttgart, Germany, September 9–12, 1991, pp. 1453–1458.

- [64] G. Kolumbán, “Phase modulation by sampling phase-locked loop,” in *Proc. URSI-ISSSE’89*, Erlangen, Germany, September 1989, pp. 93–96.
- [65] G. Kolumbán, “Transient, modulation and noise properties of sampled phase-locked loops,” in *Proc. ECCTD’87*, Paris, France, September 1987, pp. 859–864.
- [66] G. Kolumbán, “A fast frequency synthesizer for microwave radio,” in *Proc. EuMc’86*, Dublin, Ireland, September 1986, pp. 180–185.
- [67] G. Kolumbán, “A fast frequency synthesizer developed for FH systems,” in *Proc. 8th MICROCROLL*, Budapest, Hungary, August 1986, pp. 253–254.
- [68] G. Kolumbán, “Transient properties of high speed frequency synthesizers based on sampled PLL,” in *Proc. ECCTD’85*, Prague, Czechoslovakia, September 1985, pp. 314–317.
- [69] T. Bercei, K. Juhász, T. Kolumbán, and G. Kolumbán, “On design of low noise GUNN oscillators,” at *MITEKO’85*, Pardubice, Czechoslovakia, April 1985, in Russian.
- [70] G. Kolumbán, M. Krasovics, and G. Szarka, “On design of frequency synthesizers applied in SCPC-type SATCOM systems,” in *Proc. Microwave and Optical Connection and Radiolocation*, Varna, Bulgaria, October 1984, pp. 61–64.
- [71] T. Bercei, K. Juhász, T. Kolumbán, and G. Kolumbán, “GUNN oscillator stabilized by dielectric resonator,” in *Proc. 39th Popov Conference*, Moscow, the Soviet Union, May 1984, in Russian.
- [72] T. Bercei, T. Kolumbán, and G. Kolumbán, “Design of diode oscillators using one-port describing functions,” at *Third National Summer School on Microwave Physics and Engineering*, Varna, Bulgaria, October 1983.
- [73] G. Kolumbán, M. Krasovics, and G. Szarka, “Design aspects of frequency synthesizers applied in SATCOM SCPC systems,” in *Proc. YUTEL’83*, Ljubljana, Yugoslavia, October 1983, pp. I/IV/1–5.
- [74] G. Kolumbán, M. Krasovics, and G. Szarka, “Frequency synthesizers developed for the interchat equipment,” in *Proc. 38th Popov Conference*, Moscow, the Soviet Union, May 1983, in Russian.
- [75] G. Kolumbán, Sz. Király, I. Sal, K. Visegrádi, and Gy. Kósa, “Microwave local oscillator with AFC stabilization and modulating possibility,” in *Proc. 7th MICROCROLL*, Budapest, Hungary, September 1982, pp. 637–642.
- [76] A. Baranyi, J. Ladvánszky, and G. Kolumbán, “Accurate large signal characterization of microwave transistors,” in *Proc. 7th MICROCROLL*, Budapest, Hungary, September 1982, pp. 182–186.

Miscellaneous

- [1] G. Kolumbán and T. Krébesz, “Impulse Wavelet versus Chaotic Carrier: Selection of Optimum Carrier for UWB Radio,” *IEEE CAS Society Newsletter*, vol. 1, iss. 4, August 2007, Online: <<http://cassnewsletter.org/>>
- [2] G. Kolumbán, “Fault diagnosis: Fault detection and identification in qualitative systems,” Manuscript for *TEMPUS_JEP 007759-94-MODIFY textbook, APCSS-FD-11*, BME-MMT, Budapest, 1998, 55 pages.

- [3] B. Vizvári and G. Kolumbán, “Quality evaluation of random numbers generated by chaotic circuits for secure communication,” *Rutcor Research Report*, Rutgers University, New Brunswick, USA, RRR 13–96, Electronic publication, anonymous ftp: <rutcor.rutgers.edu>, directory: <pub/rrr/reports96>.
- [4] G. Kolumbán and B. Vizvári, “Acquisition properties of the sampling phase-locked loops,” oral presentation at *ECCTD’93*, Davos, August 1993.
- [5] G. Kolumbán and B. Vizvári, “Chaos with micro Feigenbaum diagrams,” poster at *Int. Conf. on the Complex Geometry in Nature entitled ”Fractals in Natural Sciences”*, Budapest, August 1993.