List of Publications and Invited Talks 22. 1. 2015

The number of citations for those 17 articles having at least50 citations according to Google Scholar are indicated by **green.**

TAPIO SARAMÄKI

BOOKS, BOOK CHAPTERS, AND SPECIAL PUBLICATIONS

[1] T. Saramäki, "Digitaalisen suodattimen siirtofunktion analyyttinen määrääminen (Analytic determining of the transfer function of digital filters)", Diploma Engineer thesis, Department of Electrical Engineering, Tampere University of Technology, 1978, 102 pages along with 3 attachments with altogether 32 additional pages.

[2] T. Saramäki, "Design of digital filters requiring a small number of arithmetic operations," Doctor of Technology thesis, Department. of Electrical Engineering, Tampere University of Technology, 1981, 226 pages.

[3] T. Saramäki, H. Palomäki, and H. Tenhunen, "Multiplier-free decimators with efficient VLSI implementation for sigma-delta A/D converters," Chapter 47 in *VLSI Signal Processing, III*, edited by R. W. Brodersen and H. S. Moscovitz, New York: IEEE Press, 1988 (*Proc. IEEE Acoustics, Speech, and Signal Processing Society Workshop on VLSI Signal Processing*, Monterey, California, November 2-4, 1988), pp. 523–534.

[4] T. Saramäki and H. Tenhunen, "Efficient VLSI-realizable decimators for a sigma-delta analog-to-digital converter," in *Oversampling Delta-Sigma Data Converters: Theory, Design, and Simulations*, edited by J. C. Candy and G. C. Temes, IEEE Press, Piscataway, NJ, 1991, pp. 471–474.

[5] T. Saramäki, "Finite impulse response filter design", Chapter 4 in *Handbook for Digital Signal Processing*, edited by S. K. Mitra and J. F. Kaiser, John Wiley and Sons, New York, 1993, pp. 155–277. **190 citations**

[6] T. Saramäki, "Design of computationally efficient FIR filters using periodic subfilters as building blocks" in *The Circuits and Filters Handbook,* edited by W.-K. Chen, CRC Press, Inc., 1995, pp. 2578–2601.

[7] *Proceedings of the First International Workshop on Transforms and Filter Banks*, Tampere, Finland, February 23-25, 1998, TICSP (Tampere University Center for Signal Processing) Series #1, co-chaired and edited by K. Egiazarian, T. Saramäki, and J. Astola, 512 pages, February 1998.

[8] *Proceedings of International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP'2001*, Pula, Croatia, June 16-18, 2001, TICSP Series #13; co-chaired and edited by T. Saramäki, K. Egiazarian, and J. Astola, 258 pages, June 2001.

[9] *Proceedings of International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP'2002*, Toulouse, France, September 7-8, 2002, TICSP Series #17, co-chaired and edited by T. Saramäki, K. Egiazarian, and J. Astola, 264 pages, September 2002.

[10] T. Saramäki and R. Bregović, "Multirate Systems and Filter Banks", Chapter 2 in *Multirate Systems: Design and Applications*, edited by Gordana Jovanovic, Idea Group Publishing, Hersey, USA, 2002, pp. 27–85.

[11] T. Saramäki and J. Yli-Kaakinen, Design of Digital Filters and Filter Banks by Optimization: Applications. TICSP Series #15, April 2002, 113 pages. [Online.] Available: http://yli-kaakinen.fi/publications/PAPERS/TICSP02.pdf

[12] T. Saramäki, "Design of computationally efficient FIR filters using periodic subfilters as building blocks" in *The Circuits and Filters Handbook*, Second Edition, edited by W.-K. Chen, CRC Press, Inc., 2003, pp. 2654–2677.

[13] T. Saramäki and Y. Lian, Guest Editors for the Special Issue on Frequency Response Masking Technique and Its Applications in *Circuits, Systems, and Signal Processing*, vol. 22, no. 2, March/April 2003, 238 pages and 10 editorial pages.

[14] *Proceedings of the 2003 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2003*, Barcelona, Spain, September 13-14, 2003, TICSP Series #22, co-chaired and edited by K. Egiazarian, T. Saramäki, and J. Astola, 228 pages, September 2003.

[15] *Proceedings of the 2004 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2004*, Vienna, Austria, September 11-12, 2004, TICSP Series # 25, co-chaired and edited by J. Astola, K. Egiazarian, and T. Saramäki, 332 pages, September 2004.

[16] *Proceedings of the 2005 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMS2005*, Riga, Latvia, June 20-22, 2005, TICSP Series #30, co-chaired and edited by J. Astola, K. Egiazarian, and T. Saramäki, 184 pages, June 2005.

[17] *Proceedings of the 2006 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP 2006*, Florence, Italy, September 2-3, 2006, TICSP Series #34, co-chaired and edited by J. Astola, K. Egiazarian, and T. Saramäki, 242 pages, September 2006.

[18] A. Gotchev, K. Egiazarian, and T. Saramäki, "Image interpolation by optimized spline-based kernels", Chapter 7 in *Advances in Signal Transforms: Theory and Applications*, edited by J. Astola and L. Yaroslavsky, Hindawi Publishing Corporation (Special EURASHIP Book Series on Signal Processing and Communications), New York, 2007, pp. 285–335.

[19] *Proceedings of the 5th International Symposium on Image and Signal and Analysis, ISPA 2007*, Istanbul, Turkey, September 27-29, 2007, edited by M. Petrou, T. Saramäki, A. Ercil, and S. Loncarić, 555 pages.

[20] J. Yli-Kaakinen and T. Saramäki, "A Systematic Algorithm for the Synthesis of Multiplierless Lattice Wave Digital Filters," invited book chapter in *Digital filters*, Fausto Pedro García Márquez (Ed.), ISBN: 978-953-307-190-9, Intech, Chapter 11, pp. 257–289, April 2011. [Online.] Available: http://www.intechopen.com/books/howtoreference/digital-filters/a-systematic-algorithm-for-the-synthesis-of-multiplierless-lattice-wave-digital-filters

[21] M. Ahsan and T. Saramäki, "M. Ahsan and T. Saramäki, "Two Novel Implementations of the Remez Multiple Exchange Algorithm for Optimum FIR Filter Design," invited book chapter in *MATLAB - A Fundamental Tool for Scientific Computing and Engineering Applications - Volume 2*, V. N. Katsikis (Ed.), ISBN: 978-953-51-0751-4, InTech, Chapter 3, pp. 37–66, September 2012. [Online.] Available: http://www.intechopen.com/books/matlab-a-fundamental-tool-for-scientific-computing-and-engineering-applications-volume-2/two-novel-implementations-of-the-remez-multiple-exchange-algorithm-for-optimum-fir-filter-design

INTERNATIONAL JOURNAL ARTICLES

[1] T. Saramäki, "Design of optimum recursive digital filters with zeros on the unit circle," *IEEE Transactions on Acoustics, Speech, and Signal Processing*, vol. ASSP-31, no. 2, pp. 450–458, April 1983.

[2] T. Saramäki, "Computationally efficient narrowband linear-phase FIR filters," *IEE Proceedings - Part G: Electronic Circuits and Systems*, vol. 130, no. 1, pp. 20–24, February 1983.

[3] T. Saramäki, "Computationally efficient circularly symmetric two-dimensional FIR filters," *IEE Proceedings - Part G: Electronic Circuits and Systems*, vol. 131, no. 2, pp. 46–50, April 1984.

[4] P. Heinonen, T. Saramäki, J. Malmivuo, and Y. Neuvo, "Periodic interference rejection using coherent sampling and wave-form estimation," *IEEE Transaction on Circuits and Systems*, vol. CAS-31, no. 5, pp. 438–446, May 1984.

[5] T. Saramäki, "A class of linear-phase FIR filters for decimation, interpolation, and narrow-band filtering," *IEEE Transactions on Acoustics, Speech, and Signal processing*, vol. ASSP-32, no. 5, pp. 1023–1036, October 1984.

[6] T. Saramäki and Y. Neuvo, "Digital filters with equiripple magnitude and group delay," *IEEE Transactions on Acoustics, Speech, and Signal processing*, vol. ASSP-32, no. 6, pp. 1194–1200, December 1984.

[7] T. Saramäki and Y. Neuvo, "An implicit solution for IIR filters with equiripple group delay," *IEEE Transactions on Circuits and Systems*, vol. CAS-32, no. 5, pp. 476–478, May 1985.

[8] T. Saramäki, "Design of digital filters with maximally flat passband and equiripple stopband magnitude," *International Journal of Circuit Theory and Applications,* vol. 13, no. 3, pp. 269–286, July 1985.

[9] T. Saramäki, "On the design of digital filters as a sum of two all-pass filters," *IEEE Transactions on Circuits and Systems*, vol. CAS-32, no. 11, pp. 1191–1193, November 1985. **78 citations**

[10] M. Renfors and T. Saramäki, "Recursive *N*th-band digital filters — Part I: Design and properties," *IEEE Transactions on Circuits and Systems*, vol. CAS-34, no. 1, pp. 24–39, January 1987. **112 citations**

[11] M. Renfors and T. Saramäki, "Recursive *N*th-band digital filters — Part II: Design of multistage decimators and interpolators," *IEEE Transactions on Circuits and Systems,* vol. CAS-34, no. 1, pp. 40–51, January 1987. (**This paper together with the above paper received the 1987 IEEE Circuits and Systems Society's Guillemin-Cauer Award**.)

[12] T. Saramäki, T.-H. Yu, and S. K. Mitra, "Very low sensitivity realization of IIR digital filters using a cascade of complex all-pass structures," *IEEE Transactions on Circuits and Systems*, vol. CAS-34, no. 8, pp. 876–886, August. 1987.

[13] T. Saramäki, "Design of FIR filters as a cascaded tapped interconnection of identical subfilters," *IEEE Transactions on Circuits and Systems*, vol. CAS-34, no. 9, pp. 1011–1029, September 1987. **68 citations**

[14] T. Saramäki and Y. Neuvo, "A class of FIR (*N*th-band) Nyquist filters with zero intersymbol interference", *IEEE Transactions on Circuits and Systems*, vol. CAS-34, no. 10, pp. 1182–1190, October 1987. **69 citations**

[15] T. Saramäki, Y. Neuvo, and S. K. Mitra, "Design of computationally efficient interpolated FIR filters", *IEEE Transactions on Circuits and Systems,* vol. CAS-35, no. 1, pp. 70–88, January 1988. **168 citations**

[16] P. Jarske, T. Saramäki, S. K. Mitra, and Y. Neuvo, "On properties and design of nonuniformly spaced linear arrays", *IEEE Transactions on Acoustics, Speech, Signal Processing*, vol. 36, no. 3, pp. 372–380, March 1988. **72 citations**

[17] P. P. Vaidyanathan, T. Q. Nguyen, Z. Doğanata, and T. Saramäki, "Improved technique for design of perfect reconstruction FIR QMF banks with lossless polyphase matrices," *IEEE Transactions on Acoustics, Speech, Signal Processing*, vol. 37, no. 7, pp. 1042–1056, July 1989. **161 citations**

[18] S. K. Mitra, A. Mahalanobis, and T. Saramäki, "A generalized structural subband decomposition of FIR filters and its application in efficient FIR filter design and implementation," *IEEE Transactions on Circuits and Systems — II: Analog and Digital Signal Processing*, vol. 40, no. 6, pp. 363–374, June 1993.

[19] T. Saramäki and T. Ritoniemi, "Optimization of digital filter structures for VLSI implementation," *AUTOMATIKA, Journal for Control, Measurements, Electronics, Computing and Communications*, vol. 34, no. 3-4, pp. 111–116, 1993.

[20] T. Raita-aho, T. Saramäki, and O. Vainio, "A digital filter chip for ECG signal processing," *IEEE Transactions on Instrumentation and Measurement*, vol. 43, no. 4, pp. 644–649, August1994.

[21] T. Ritoniemi, E. Pajarre, S. Ingalsuo, T. Husu, V. Eerola, and T. Saramäki, "A stereo audio sigma-delta A/D-converter," *IEEE Journal of Solid-State Circuits*, vol. 29, no. 12, pp. 1514–1523, December 1994.

[22] T. Saramäki, Y. C. Lim, and R. Yang, "The synthesis of half-band filter using frequency-response masking technique," *IEEE Transactions on Circuits and Systems — II: Analog and Digital Signal Processing*, vol. 42, no. 1, pp. 58–60, January 1995.

[23] O. Vainio, M. Renfors, and T. Saramäki, "Recursive implementation of FIR differentiators with optimum noise attenuation," *IEEE Transactions on Instrumentation and Measurement*, vol. 46, no. 5, pp. 1202–1207, October 1997. **60 citations**

[24] J. Yli-Kaakinen and T. Saramäki, "Design of very low-sensitivity and low-noise recursive digital filters using a cascade of low-order lattice wave digital filters," (**a paper among only 19 invited articles to the special issue on ISCAS'98**) *IEEE Transactions on Circuits and Systems — II: Analog and Digital Signal Processing*, vol. 46, no. 7, pp. 906–914, July 1999.

[25] K. Surma-aho and T. Saramäki, "A systematic technique for designing approximately linear phase recursive digital filters,"(**a paper among only 19 invited articles to the special issue on ISCAS'98**) *IEEE Transactions on Circuits and Systems —II: Analog and Digital Signal Processing*, vol. 46, no. 7, pp. 956–963, July 1999.

[26] R Bregović and T. Saramäki, "Design of two-channel low-delay FIR filter banks using constrained optimization," *CIT, Journal of Computing and Information Technology*, vol. CIT 8, no. 4, pp. 341–348, 2000.

[27] T. Saramäki and Y. C. Lim, "Use of the Remez Algorithm for designing FRM based FIR Filters," (Special Issue on Frequency Response Making Technique and Its Applications, Guest-Editors: T. Saramäki and Y. Lian) *Circuits, Systems, and Signal Processing*, vol. 22, no. 2, pp. 77–97, March/April 2003.

[28] H. Johansson and T. Saramäki, "Two-channel FIR filter banks utilizing the FRM Approach," (the Special Issue on Frequency Response Making Technique and Its Applications, Guest-Editors: T. Saramäki and Y. Lian) *Circuits, Systems, and Signal Processing*, vol. 22, no. 2, pp. 157–192, March/April 2003.

[29] R. Bregović and T. Saramäki, "A general-purpose optimization approach for designing two-channel FIR filter banks," *IEEE Transactions on Signal Processing*, vol. 51, no. 7, pp. 1783–1791, July 2003.

[30] T. Saramäki, J. Yli-Kaakinen, and H. Johansson, "Optimization of frequency-response masking based FIR filters," (Special Issue on Frequency-Response Making Technique; Guest-Editor: Y. C. Lim) *Journal of Circuits, Systems, and Computers*, vol. 12, no. 5, pp. 563–591, October 2003. (**This paper received the best paper award in this issue.**)

[31] Lj. Milić and T. Saramäki, "Power-complementary IIR filter pairs with an adjustable crossover frequency," *Facta Universitatis, Series: Electronics and Energetics*, vol. 16, no. 3, pp. 295–304, Dec. 2003.

[32] W.-S. Lu, T. Saramäki, and R. Bregović, "Design of practically perfect-reconstruction cosine-modulated filter banks: A second-order cone programming approach," *IEEE Transactions on Circuits and Systems — I: Regular Papers*, vol. 51, no. 3, pp. 552–563, March 2004. **50 citations**

[33] R. Bregović and T. Saramäki, "A systematic technique for designing linear-phase FIR prototype filters for perfect-reconstruction cosine-modulated and modified DFT filterbanks," *IEEE Transactions on Signal Processing*, vol. 53, no. 8, pp. 3193–3201, August 2005.

[34] M. B. Furtado. P. S. R. Diniz, S. L. Netto, and T. Saramäki, "On the design of high-complexity cosine-modulated transmultiplexers based on the frequency-response masking approach," *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 52, no. 11, pp. 2413–2426, November 2005. (**This paper received the 2006 IEEE Circuits and Systems Society's Guillemin-Cauer Award.**)

[35] Y. C. Lim, Y. J. Yu , and T. Saramäki, "Optimum masking levels and coefficient sparseness for Hilbert transformers and half-band filters designed using the frequency-response masking technique," *IEEE Transactions on Circuits and Systems — I: Regular Papers*, vol. 52, no. 11, pp. 2444–2453, November 2005.

[36] Y. J. Yu, Y. C. Lim, and T. Saramäki, "Restoring coefficient symmetry in polyphase implementation of linear-phase FIR filters," (the Special Issue on Computationally Efficient Digital Filters: Design Techniques and Applications, Guest-Editors: Y. Lian and W.-S. Lu) *Circuits, Systems, and Signal Processing*, vol. 25, no. 2, pp. 253–264, March/April 2006.

[37] J. Yli-Kaakinen and T. Saramäki, "Multiplication-free polynomial-based FIR filters with an adjustable fractional delay," (the Special Issue on Computationally Efficient Digital Filters: Design Techniques and Applications, Guest-Editors: Y. Lian and W.-S. Lu) *Circuits, Systems, and Signal Processing*, vol. 25, no. 2, pp. 265–294, March/April 2006.

[38] B. Dumitrescu, R. Bregović, and T. Saramäki, "Simplified design of low-delay oversampled NPR GDFT filterbanks," EURASIP Journal on Applied Signal Processing, Article ID 42961, 11 pages, 2006.

[39] J. Vesma and T. Saramäki, "Polynomial-based interpolation filters — Part I: Filter synthesis," *Circuits, Systems, and Signal Processing*, vol. 26, no. 2, pp. 115–146, March/April 2007.

[40] Y. C. Lim, Y. J. Yu , K. L. Teo, and T. Saramäki, "FRM-based FIR filters with optimum finite word-length performance," *IEEE Transactions on Signal Processing*, vol. 55, no. 6, pp. 2914–2924, June 2007.

[41] J. Yli-Kaakinen and T. Saramäki, "A systematic algorithms for the design of lattice wave digital filters with short-coefficient wordlength," *IEEE Transactions on Circuits and Systems —I: Regular Papers*, vol. 54, no. 8, pp. 1838–1851, August 2007.

[42] R. Lehto, T. Saramäki, and O. Vainio, "Synthesis of narrowband linear-phase FIR filters with a piecewise-polynomial impulse response," *IEEE Transactions on Circuits and Systems— I: Regular Papers*, vol. 54, no. 10, pp. 2262–2276, October 2007.

[43] R. Bregović, Y. C. Lim, and T. Saramäki, "Frequency-response masking-based design of nearly perfect-reconstruction two-channel FIR filterbanks with rational sampling factors," *IEEE Transactions on Circuits and Systems—I: Regular Papers*, vol. 55, no. 7, pp. 2002–2012, August 2008.

[44] B. Dumitrescu, R. Bregović, and T. Saramäki, "Design of low-delay nonuniform oversampled filter-banks," *Signal Processing*, vol. 88, no. 10, pp. 2518–2525, October 2008.

[45] P. Martín-Martín, R. Bregović, A. Martín -Marcos, F. Cruz-Roldán, and T. Saramäki, "A generalized window approach for designing transmultiplexers," *IEEE Transactions on Circuits and Systems— I: Regular Papers*, vol. 55, no. 9, pp. 2696–2706, October 2008.

[46] F. Cruz- Roldán, P. Martín-Martín; J. Sáez-Landete, M. Blanco-Velasco, and T. Saramäki, "A fast windowing-based technique exploiting spline functions for designing modulated filter banks," *IEEE Transactions on Circuits and Systems—I: Regular Papers*, vol. 56, no. 1, pp. 168–178, January 2009.

[47] R. Lehto, T. Saramäki, and O. Vainio, "Synthesis of wideband linear-phase FIR filters with a piecewise-polynomial-sinusoidal impulse response," *Circuits, Systems, and Signal Processing,* vol. 29, no. 1, pp. 25–50, February 2010.

[48] J. Yli-Kaakinen and T. Saramäki, "An efficient algorithm for the optimization of FIR filters synthesized using the multistage frequency-response masking approach," *Circuits, Systems, and Signal Processing,* vol. 30, no. 1, pp. 157–183, February 2011.

[49] R. Bregović, Y. J. Yu, T. Saramäki, and Y. C. Lim, "Implementation of linear-phase FIR filters for a rational sampling-rate conversion utilizing the coefficient symmetry," *IEEE Transactions on Circuits and Systems—I: Regular Papers*, vol. 58, pp. 548–561, no.3, March. 2011.

[50] A. Eghbali, T. Saramäki, and H. Johansson, "On two-stage Nyquist pulse shaping filters," *Transactions Signal Processing*, vol. 60, no. 1, pp. 483–488, January 2012.

[51] A. Eghbali, H. Johansson, and T. Saramäki, "A method for the design of Farrow-structure based variable fractional-delay FIR filters, " *Signal Processing*, vol. 93, no. 5, pp. 1341-1348, May 2013.

[52] A. Eghbali, T. Saramäki, and H. Johansson, "Conditions for Lth-band filters of order $2N$ as cascades of identical linear-phase FIR spectral factors of order N," *Signal Processing*, vol. 97, no. 5, pp. 1–8, April 2014.

[53] Lj. Milić and T. Saramäki, "Three classes of complementaryIIR filter pairs with variable crossover frequency," to appear in Circuits, Systems, and Signal Processing.

INTERNATIONAL CONFERENCE ARTICLES

[1] Y. Neuvo, T. Saramäki, and O. Simula, "Digital transfer functions with reduced number of zeros," in *Proc. Summer Symposium on Circuit Theory 1977, SSCT 77*, Prague, Czechoslovakia, pp. 65–69, September 5–9, 1977, pp. 65–69.

[2] Y. Neuvo, T. Saramäki, and R. Gabel, "Digital filters with prescribed zeros," in *Proc. 1978 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 78,* Tulsa, Oklahoma, April 10–12, 1978, pp. 487–490.

[3] T. Saramäki and Y. Neuvo, "New transformed variables for designing recursive digital filters," in *Proc. 1979 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 79* ,Washington, D.C., USA, April 2–4, 1979, pp. 801–804.

[4] T. Saramäki and Y. Neuvo, "Analytic solutions for the poles of recursive digital filters," in *Proc. 1979 IEEE International Symposium on Circuits and Systems*, Tokyo, Japan, July 17–19, 1979, pp. 350–351.

[5] T. Saramäki, "Optimum recursive digital filters with zeros on the unit circle," in *Proc. 1980 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 80*, Denver, Colorado, April 9–11, 1980, vol. 1, pp. 275–278.

[6] T. Saramäki and Y. Neuvo, "Equal ripple amplitude and group delay digital filters," in *Proc. 1980 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 80*, Denver, Colorado, April 9–11, 1980, vol.1, pp. 283–287.

[7] T. Saramäki and Y. Neuvo, "IIR filters with equiripple group delay," in *Proc. 1980 IEEE International Symposium on Circuits and Systems*, Houston, Texas, April 28–30, 1980, vol.2, pp. 589–591.

[8] T. Saramäki and Y. Neuvo, "Equal ripple amplitude and group delay digital filters for sampling rate alteration," in *Proc. 1980 IEEE International Symposium on Circuits and Systems*, Houston, Texas, pp. 283–287, April 28–30, 1980, vol.2, pp. 597–600.

[9] T. Saramäki and Y. Neuvo, "IIR filters with maximally flat passband and equiripple stopband," in *Proc. the 1980 European Conference on Circuit Theory and Design, ECCTD'80*, Warsaw, Poland, September 2–5, 1980, vol. 2, pp. 468–473.

[10] T. Saramäki and Y. Neuvo, "Digital filter design in new transformed frequency variables," in *First European Signal Processing Conference, EUSIPCO-80, Short Communication and Poster Diges*t, Lausanne, Switzerland, September 16–19, 1980, pp. 213–214.

[11] T. Saramäki and Y. Neuvo, "IIR filters with flat delay at prescribed frequencies," in *First European Signal Processing Conference, EUSIPCO-80, Short Communication and Poster Diges*t, Lausanne, Switzerland, September 16–19, 1980, pp. 215–216.

[12] T. Saramäki, Y. Neuvo, and T. Saarinen, "Equal ripple magnitude and maximally flat group delay digital filters," in *Proc. 1981 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 81*, Atlanta, Georgia, April 1–3, 1981, vol. 1, pp. 236–239.

[13] T. Saramäki and Y. Neuvo, "Efficiently realizable digital filter transfer functions," in *Proc. IFAC Symposium on Theory and Applications of Digital Contro*l, New Delhi, India, Jan. 5-7, 1982,. vol. 2, pp. 19–25.

[14] T. Saramäki, "Narrowband linear-phase FIR filters requiring a small number of multipliers," in *Proc. 1982 IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP 81*, Paris, France, May 3–5, 1982, vol. 1, pp. 278–281.

[15] T. Saramäki, "Design of optimum wideband recursive digital filters," in *Proc. 1982 IEEE International Symposium on Circuits and Systems*, Rome, Italy, May 10–12, 1982, vol. 2, pp. 503–506.

[16] T. Saramäki, "A new class of linear-phase FIR filters for decimation, interpolation, and narrow-band filtering," in *Proc. 1982 IEEE International Symposium on Circuits and Systems*, Rome, Italy, May 10–12, 1982, vol. 3, pp. 804–807.

[17] T. Saramäki, "Computationally efficient two-dimensional circularly symmetric nonrecursive digital filters," in Proc. *1983 IEEE International Symposium on Circuits and Systems*, Newport Beach, California, May 2–4, 1983, vol. 2, pp. 900–903.

[18] T. Saramäki, "Efficient recursive digital filters for sampling rate conversion," in *Proc. 1983 IEEE International Symposium on Circuits and Systems*, Newport Beach, California, May 2–4, 1983, vol. 3, pp. 1322–1325.

[19] T. Saramäki, Y. Neuvo, and H. Skogsrud, "Signal processor implementation of modem filters," in *Proc. Sixth European Conference on Circuit Theory and Design, ECCTD'83*, Stuttgart, Federal Republic of Germany, September 6–8, 1983, pp. 287–289.

[20] K.-P. Estola and T. Saramäki, "Efficient microprocessor-based linear-phase FIR filters for ECG-signal processing," in *Proc. Sixth European Conference on Circuit Theory and Design, ECCTD'83*, Stuttgart, Federal Republic of Germany, September 6–8, 1983, pp. 420–422.

[21] T. Saramäki and Y. Neuvo, "A unified approach to IIR digital filter design," in *Proc. Sixth European Conference on Circuit Theory and Design, ECCTD'83*, Stuttgart, Federal Republic of Germany, September 6–8, 1983, pp. 557–559.

[22] K.-P. Estola and T. Saramäki, "High performance FIR filters without multipliers for ECG signal processing," in *Proc. 1984 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Montreal, Canada, pp. 1462–1465, May 7–10, 1984, vol. 3, pp. 1462–1464.

[23] T. Kohonen, K. Mäkisara, and T. Saramäki, "Phonotopic maps–insightful representation of phonological features for speech recognition," in *Proc. IEEE Seventh International Conference on Pattern Recognition*, Montreal, Canada, pp. 182–185, July 30–August 2, 1984.

187 citations

[24] T. Saramäki, "A unified approach for the design of FIR filters as a cascaded tapped interconnection of identical subfilters," in *Proc. International Conference on Computers, Systems and Signal Processing*, Bangalore, India, December 9–12, 1984, vol. 3, pp. 1649–1652.

[25] T. Saramäki and Y. Neuvo, "FIR Nyquist filters with zero intersymbol interference," *in Proc. International Conference on Computers, Systems and Signal Processing*, Bangalore, India, December 9–12, 1984, vol. 3, pp. 1653–1657.

[26] T. Saramäki and K.-P. Estola, "Design of linear-phase partly digital anti-aliasing filters," in Proc. *1985 IEEE International Conference on Acoustics, Speech, Signal Processing*, Tampa, Florida, March 26–29, 1985, vol. 1, pp. 65–68.

[27] M. Renfors and T. Saramäki, "Design and properties of recursive *N*th-band digital filters and their use in sampling rate alteration," in *Proc. 1985 IEEE International Symposium on Circuits and Systems*, Kyoto, Japan, June 5–7, 1985, vol.1, pp. 75–78.

[28] K.-P. Estola and T. Saramäki, "A new method for designing equiripple error group delay digital filters," in *Proc. 1985 IEEE International Symposium on Circuits and Systems*, Kyoto, Japan, June 5–7, 1985, vol. 1, pp. 271–274.

[29] T. Saramäki, Y. Neuvo, and S. K. Mitra, "Efficient interpolated FIR filters," in *Proc. 1985 IEEE International Symposium on Circuits and Systems*, Kyoto, Japan, June 5–7, 1985, vol. 3, pp. 1145–1148.

[30] K. Järvinen, M. Renfors, T. Saramäki, and Y. Neuvo, "Design of an IIR filter bank for dual tone receivers," in *Dixième Colloque sur le Traitement du Signal et ses Applications*, Nice, France, May 20–24,1985, pp. 443–448.

[31] A. Mäkivirta, K.-P. Estola, T. Saramäki, S. Kalli, and K. Järvinen, "Exercise ECG preprocessor with a high-performance digital filter," in *Proc. XIV International Conference on Medical and Biological Engineering and VII International Conference on Medical Physics: Medical and Biological Engineering*, Espoo, Finland, August 11–16, 1985, pp. 629–630.

[32] M. Renfors and T. Saramäki, and K.-P. Estola, "Efficient FIR, IIR, and hybrid Nyquist filters with zero intersymbol interference," in *Proc. 1986 IEEE International Conference on Acoustics, Speech, and Signal Processing,* Tokyo, Japan, April 7–11, 1986, vol. 4, pp. 2591–2594.

[33] T. Saramäki, "Design of optimal multistage IIR and FIR filters for sampling rate alteration", in *Proc. 1986 IEEE International Symposium on Circuits and Systems*, San Jose, California, May 5-7, 1986, vol. 1, pp. 227–230.

[34] M. Renfors and T. Saramäki, "A class of approximately linear phase digital filters composed of allpass subfilters," in *Proc. 1986 IEEE International Symposium on Circuits and Systems*, San Jose, California, May 5–7, 1986, vol. 2, pp. 678–681. **73 citations**

[35] T. Saramäki, T.-H. Yu, and S. K. Mitra, "Very low sensitivity realization of IIR digital filters using a cascade of complex all- pass structures", in *Proc. 1986 IEEE International Symposium on Circuits and Systems*, San Jose, California, May 5-7, 1986, vol. 3, pp. 1113–1116.

[36] T. Kolehmainen, T. Saramäki, M. Renfors, and Y. Neuvo, "Signal processor implementation of computationally efficient FIR filters—Theory and practice", in *Proc. 2nd Nordic Symposium on VLSI in Computers and Communications, VLSI C&C*, Linköping, Sweden, June 2–4 1986, 10 pages.

[37] T. Saramäki and Y. Neuvo, "Design of computationally efficient interpolated FIR filters", in in *Proc. 2nd Nordic Symposium on VLSI in Computers and Communications, VLSI C&C*, Linköping, Sweden, June 2–4 1986, 15 pages.

[38] T. Saramäki and M. Renfors, "A novel approach for the design of IIR filters as a tapped cascaded interconnection of identical allpass subfilters," in Proc. *1987 IEEE International Symposium on Circuits and Systems*, Philadelphia, Pennsylvania, May 4–7, 1987, vol. 2, pp. 629–632.

[39] T. Saramäki, "Efficient iterative algorithms for the design of optimum IIR filters with arbitrary specifications," in *Digital Signal Processing–87: Proceedings of the International Conference,* Florence, Italy, September 7–10, 1987.

[40] K. Chen and T. Saramäki, "Synthesis of extremely low sensitivity structurally symmetric digital LDI ladder filters," in *Digital Signal Processing–87: Proceedings of the International Conference,* Florence, Italy, September 7–10, 1987, pp. 37–41.

[41] T. Saramäki, "An efficient Remez-type algorithm for the design of optimum IIR filters with arbitrary partially constrained specifications," in *Proc. 1987 International Conference on Communication Technology*, Nanjing, China, November 9–11, 1987 pp. 630–633.

[42] T. Saramäki and K. Chen, "Efficient realization of transfer functions using symmetric digital LDI ladder filters," in *Proc. 1987 International Conference on Communication Technology*, Nanjing, China, November 9–11, pp. 638–641.

[43] T. Q. Nguyen, T. Saramäki, and P. P. Vaidyanathan, "Eigenfilters for the design of special transfer functions with applications in multirate signal processing," in *Proc. 1988 IEEE International Conference on Acoustics, Speech, and Signal Processing*, New York City, USA, April 11–14, vol. 3, pp. 1467–1470.

[44] P. P. Vaidyanathan, T. Q. Nguyen, and T. Saramäki, "Improved approach for the design of perfect-reconstruction FIR QMF banks, with lossless lattice structures," in *Proc. 1988 IEEE International Conference on Acoustics, Speech, and Signal Processing*, New York City, USA, April 11–14, vol. 3, pp. 1471–1474.

[45] K. Chen, L. Wanhammar, and T. Saramäki, "Wave digital ladder filters with low sensitivity and roundoff noise," in *Proc. 1988 IEEE International Symposium on Circuits and Systems*, Espoo, Finland, June 7–9, 1988, vol. 1, pp. 547–550.

[46] T. Saramäki and H. Tenhunen, "Efficient VLSI-realizable decimators for a sigma-delta analog-to-digital converter," in *Proc. 1988 IEEE International Symposium on Circuits and Systems*, Espoo, Finland, June 7–9, 1988, vol. 2, pp. 1525–1528.

[47] T. Saramäki and A.T. Fam, "Subfilter approach for designing efficient FIR filters," (**an invited tutorial paper**) in *Proc. 1988 IEEE International Symposium on Circuits and Systems*, Espoo, Finland, June 7–9, 1988, vol. 3, pp. 2903–2915.

[48] T. A. Ramstad and T. Saramäki, "Efficient multirate realization for narrow transition-band FIR filters," in *Proc. 1988 IEEE International Symposium on Circuits and Systems*, Espoo, Finland, June 7–9, 1988, vol. 3, pp. 2019–2022.

[49] T. Saramäki, "A class of window functions with nearly minimum sidelobe energy for designing FIR filters," in *Proc. 1989 IEEE International Symposium on Circuits and Systems*, Portland, Oregon, May 8–11, 1987, vol. 1, pp. 359–362. **70 citations**

[50] T. Saramäki and S. K. Mitra, "Design of efficient interpolated FIR filters using recursive running sum filters," in *Proc. Sixth International Symposium on Networks, Systems, and Signal Processing* , Zagreb, Yugoslavia, June 1989, pp. 20–23.

[51] T. G. Campbell and T. Saramäki, "Recursive linear-phase FIR filter structures with piecewise-polynomial impulse response," in *Proc. Sixth International Symposium on Networks, Systems and Signal Processing*, Zagreb, Yugoslavia, June 1989, pp. 16–19.

[52] T. Saramäki, T. Karema, T. Ritoniemi, J. Isoaho, H. Tenhunen, "VLSI-realizable multiplier-free interpolators for sigma-delta D/A-converters" (**an invited paper**), in *Proc. International Conference on Circuits and Systems*, Nanjing, China, July 6–8, 1989, pp. 60–63.

[53] T. Karema, T. Ritoniemi, T. Saramäki, and H. Tenhunen, *"An oversampled analog-to-digital conversion technique," in Proc. 1989 URSI International Symposium on Signals, Systems, and Electronics, IS-SSE'89, Erlangen, Federal Republic of Germany, September 18–20, pp. 820–823*

[54] T. Ramstad and T. Saramäki, "Multistage, multirate FIR filter structures for narrow transition-band filters," in *Proc. 1990 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 1–3, 1990, vol. 3, pp. 2017–2021.

[55] T. Saramäki and A. T. Fam, "Properties and structures of linear-phase FIR filters based on switching and resetting of IIR filters," in *Proc. 1990 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 1–3, 1990, vol. 4, pp. 3272–3277.

[56] T. Saramäki, T. Karema, T. Ritoniemi, and H. Tenhunen, "Multiplier-free decimator algorithms for superresolution oversampled converters," in *Proc. 1990 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 1–3, 1990, vol. 4, pp. 3275–3278.

[57] T. Saramäki, "Adjustable windows for the design of FIR filters–A tutorial" (**an invited paper**), in *Proc. 6th Mediterranean Electrotechnical Conference*, Ljubljana, Slovenia, Yugoslavia, May 22–24, vol. 1, pp. 28–33.

[58] T. Saramäki, T. Karema, T. Ritoniemi, and H. Tenhunen, "VLSI-realizable multiplier-free interpolators for high-order sigma/delta D/A converters," in *Proc. 6th Mediterranean Electrotechnical Conference*, Ljubljana, Slovenia, Yugoslavia, May 22–24, vol. 1, pp. 295–298.

[59] T. Saramäki, "A systematic technique for designing highly selective multiplier-free FIR filters," in *Proc. 1991 IEEE International Conference on Circuits and Systems*, Singapore, June 11–14, 1991, vol. 1, pp. 484–487.

[60] T. Saramäki, J. Vidiščáková, and S. K. Mitra, "Efficient design and implementation of FIR filter banks with equal passband widths," *Proc. 1991 IEEE International Conference on Circuits and Systems*, Singapore, June 11–14, 1991, vol. 1, pp. 654–657.

[61] T. Karema, T. Ritoniemi, T. Saramäki, and H. Tenhunen, "A 20-bit sigma-delta D/A converter prototype for audio applications," in *Proc. International Conference on Analogue to Digital and Digital to Analogue Conversion*, Swansea , United Kingdom, September 17–19, 1991, pp. 136–141.

[62] T. Raita-aho, T. Saramäki, and O. Vainio, "A digital filter chip for ECG signal processing," in *Proc. Sixth NORSILC/NORCHIP Seminar*, Copenhagen, Denmark, October 23–24, 1991, pp. 19.0–19.10.

[63] T. Saramäki and S. K. Mitra, "Multiple branch FIR filters for sampling rate conversion," in *Proc. 1992 IEEE International Conference on Circuits and Systems*, San Diego, California, May 10–13, 1992,vol. 2, pp. 1007–1010.

[64] T. Saramäki, "Designing prototype filters for perfect-reconstruction cosine-modulated filter banks," in *Proc. 1992 IEEE International Conference on Circuits and Systems*, San Diego, California, May 10–13, 1992,vol. 3, pp. 1605–1608.

[65] T. Saramäki, "An efficient Remez-type algorithm for the design of optimum IIR filters with arbitrary partially constrained specifications," in *Proc. 1992 IEEE International Conference on Circuits and Systems*, San Diego, California, May 10–13, 1992, vol. 5, pp. 2577–2580.

[66] T. Karema, T. Husu, T. Saramäki, and T. Tenhunen, "A filter processor for interpolation and decimation," in *Proc. 1992 IEEE Custom Integrated Circuits Conference*, Boston, Massachusetts, May 3–6, 1992, pp. 19.2.1–19.2.4.

[67] M. Renfors and T. Saramäki, "Pulse-shaping filters for digital transmission systems," in *IEEE Global Telecommunications Conference, 1992, GLOBECOM '92,* Orlando, Florida, December 6–9, 1992, vol. 1, pp. 467–471.

[68] T. Saramäki and T. Ritoniemi, "Optimization of digital filter structures for VLSI implementation," in *Proc. Tenth NORCHIP Seminar*, Helsinki, Finland, November 3–4. 1992, pp. 119–128.

[69] T. Saramäki and T. Ritoniemi, "Optimization of digital filter structures for VLSI implementation," in *Proc. 38th International Annual Conference, KoREMA*, Zagreb, Croatia, April 26–28, 1993, pp. 521–526.

[70] T. Saramäki and T. Ritoniemi, "Tapped comb filters for decimation," in *Proc. 5th International Symposium on IC Technology, Systems, and Applications, ISIC-93,* Singapore, September 15–17, 1993, pp. 435–440.

[71] T. Saramäki and T. Ritoniemi, "VLSI realizable digital filter structures," in *Proc. International Conference on Signal Processing*, Beijing, China, October 26–30, 1993, pp. 455–458.

[72] T. Ritoniemi, E. Pajarre, S. Ingalsuo, T. Husu, V. Eerola, and T. Saramäki, "A stereo 97dB SNR audio sigma-delta ADC," in *Proc. 1994 IEEE International Solid-State Circuit Conference* , San Francisco, California, February 24–27, pp. 198, 199, 338, February 1994.

[73] B. Jaworski and T. Saramäki, "Linear phase IIR filters composed of two parallel allpass sections" in *Proc. 1994 IEEE International Symposium on Circuits and Systems*, London, England, May 30–June 2, 1994,vol. 2, pp. 537–540.

[74] T. Saramäki, "Generalizations of classical recursive digital filters and their design with the aid of a Remez-type algorithm," in *Proc. 1994 IEEE International Symposium on Circuits and Systems*, London, England, May 30–June 2, 1994,vol. 1, pp. 549–552.

[75] T. Laakso, M. Lang, and T. Saramäki, "Design of limit-cycle-free recursive transfer functions for fixed-point direct form implementation," in *Proc. 1994 IEEE International Symposium on Circuits and Systems*, London, England, May 30–June 2, 1994,vol. 2, pp. 477–480.

[76] E. Pajarre and T. Saramäki, "Efficient VLSI implementation techniques for FIR filters", in *Proc.1994 DSPx Exhibition & Symposium*, San Francisco, California, June 1994, pp. 560–566.

[77] T. Saramäki and O. Vainio, "Structures for generating polynomial impulse responses," in *Proc. 37th Midwest Symposium on Circuits Systems*, Lafayette, Louisiana, August 3–5, 1994, vol. 2, pp. 1315–1318.

[78] M. Renfors, T. Saramäki, and O. Vainio, "Recursive implementation of FIR differentiators," in *Proc. 38th Midwest Symposium on Circuits and Systems*, Rio de Janeiro, Brazil, August 13–16, vol. 1, p. 570.

[79] T. Saramäki and M. Renfors, "A Remez-type algorithm for designing digital filters composed of all-pass sections based on phase approximations," in *Proc. 38th Midwest Symposium on Circuits and Systems*, Rio de Janeiro, Brazil, August 13–16, 1995, vol. 1, pp. 571–575.

[80] T. I. Laakso, T. Saramäki, and G. D. Cain, "Asymmetric Dolph-Chebyshev, Saramäki, and transitional windows for fractional delay FIR filter design," in *Proc. 38th Midwest Symposium on Circuits and Systems*, Rio de Janeiro, Brazil, August 13–16, 1995, vol. 1, pp. 580–583.

[81] T. Saramäki, "Optimization of cosine-modulated near perfect- reconstruction pseudo-QMF banks for practical applications," presented at *the European Workshop on Multirate Digital Signal Processing and Applications*, Hamburg, Germany, March 20–21, 1996 (copies of the transparencies of this workshop have been collected together).

[82] K. Egiazarian, T. Saramäki, H. Chugurian, J. Astola, "Modified B-spline interpolators and filters: Synthesis and efficient implementation," in Proc. *1996 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Atlanta, Georgia, May 7–10, 1996, vol. 3, pp. 1743–1746.

[83] T. Saramäki and M. Ritoniemi, "An efficient approach for conversion between arbitrary sampling frequencies," in *Proc. 1996 IEEE International Symposium on Circuits and Systems*, Atlanta, Georgia, May 12–15, 1996, vol. 2, pp. 285–288.

[84] J. Vesma and T. Saramäki, "Interpolation filters with arbitrary frequency response for all-digital receivers," in *Proc. 1996 IEEE International Symposium on Circuits and Systems*, Atlanta, Georgia, May 12–15, 1996, vol. 2, pp. 586–571. **121 citations**

[85] O. Vainio, M. Renfors, and T. Saramäki, "Recursive implementation of FIR differentiators with optimum noise attenuation," in *Proc. IEEE Instrumentation and Measurement Technology Conference, 1996, IMTC-96*, Brussels, Belgium, June 4–6, 1996, pp.344–349.

[86] J. Vesma and T. Saramäki, "Optimization and efficient implementation of fractional delay FIR filters," in *Proc. Third IEEE International Conference on Electronics, Circuits, and Systems,ICECS'96*, Rodos, Greece, October 13–16, 1996, vol. 1, pp. 546–549.

[87] I. P. Anukhin, V. V. Lukin, and T. Saramäki, "Array step-like apodization function synthesis, parameter optimization and implementation aspects," in *Proc. 6th International Conference on Mathematical Methods in Electromagnetic Theory, MMET'96*, Lviv, Ukraine, September 10–13, 1996, pp. 65–68.

[88] V. V. Lukin and T. Saramäki, "Step-like weighting windows for DSP in spectral analysis and antenna arrays," in *Proc. 1996 IEEE Digital Signal Processing Workshop*, Loen, Norway, September 1–4, 1996, pp. 362–365.

[89] J. Vesma and T. Saramäki, "Optimization and efficient implementation of FIR filters with adjustable fractional delay," in *Proc. 1997 IEEE International Symposium on Circuits and Systems*, Hong Kong, June 9–12, 1997, vol. 4, pp. 2256–2259. **82 citations**

[90] T. Saramäki and T. Ritoniemi, "A modified comb filter structure for decimation," in *Proc. 1997 IEEE International Symposium on Circuits and Systems*, Hong Kong, June 9–12, 1997, vol. 4, pp. 2353–2356.

[91] H. Ridha, J. Vesma, T. Saramäki, and M. Renfors, "Derivative approximations for sampled signals based on polynomial interpolation," in *Proc. 13th International Conference on Digital Signal Processing, DSP 97*, Santorin, Hellas, Greece, July 2–4, 1997, vol. 2, pp. 939–942.

[92] H. Ridha, J. Vesma, M. Renfors, and T. Saramäki, "Discrete-time simulation of continuous-time systems using generalized interpolation techniques," in *Proc. 1997 Summer Computer Simulation Conference*, Arlington, Virginia, July 13–17, 1997, pp. 914–919.

[93] I. P. Anukhin, V. V. Lukin, S. N. Kobzev, A. A. Zelensky, and T. Saramäki, "Convolution windows optimization for equidistant antenna arrays with digital signal processing," in *Proc. Second International Conference on Antenna Theory and Techniques*, Kyiv, Ukraine, May 20–22, 1997, pp. 53–55.

[94] I. P. Anukhin, V. V. Lukin, N. N. Ponomarenko, A. A. Zelensky, T. Saramäki, and K. Zbaida, "Sum-type Kaiser-Bessel windows for anodized antenna arrays in *Proc. Second International Conference on Antenna Theory and Techniques*, Kyiv, Ukraine, May 20–22, 1997, pp. 56–58.

[95] T. Saramäki and K. Egiazarian, "A class of discrete-time linear- phase nearly orthogonal wavelet banks", in *Proc. International Conference on Computer Science and Information Technologies*, 1997, *CSIT-1997*, Yerevan, Armenia, September 25–29,1997. pp. 171–174.

[96] T. Saramäki, "Efficient DSP algorithms and their optimization for VLSI and signal processor implementations," (**a plenary talk**) in *Proc. of Plenary Presentations at International Conference on Computer Science and Information Technologies, 1997, CSIT-1997*, Yerevan, Armenia, September 25–29, 1997, pp. 14–32.

[97] A. Mirmassoumi, O. Vainio, and T. Saramäki, "Synthesizable ASIC macros for polynomial response generation", in *Proc. 15th NORCHIP Conference*, Tallinn, Estonia, November 10–11, 1997 , pp. 105–112.

[98] A. Mirmassoumi, O. Vainio, and T. Saramäki, "Implementation and comparative analysis of an efficient polynomial response generator structure," in *Proc. TAU97 Workshop*, Austin, Texas, December 4–5, 1997, pp. 105–112.

[99] T. Saramäki, "A generalized class of cosine-modulated filter banks," in *Proc. First International Workshop on Transforms and Filter Banks*, Tampere, Finland, February 23–15, 1998, pp. 336–365, published as TICSP Series #1, February 1998, edited by K. Egiazarian, T. Saramäki, and J. Astola.

[100] J. Vesma, R. Hamila, M. Renfors, and T. Saramäki, "Continuous-time signal processing based on polynomial approximation," in *Proc. 1998 IEEE International Symposium on Circuits and Systems*, Monterey, California, May 31–June 3, 1998, vol. 5, pp. 61–65.

[101] K. Surma-aho and T. Saramäki, "A systematic technique for designing approximately linear phase recursive digital filters," in *Proc. 1998 IEEE International Symposium on Circuits and Systems*, Monterey, California, May 31–June 3, 1998, vol. 5, pp. 399–403. (**This article was invited to be published as a journal paper no. 25.**).

[102] J. Yli-Kaakinen and T. Saramäki, "Design of very low-sensitivity and low-noise recursive digital filters using a cascade of low-order wave lattice filters," Proc. *Proc. 1998 IEEE International Symposium on Circuits and Systems*, Monterey, California, May 31–June 3, 1998, vol. 5, pp. 404–408. (**This article was invited to be published as journal paper no. 24.**).

[103] K. Egiazarian, D. Gevorgian, S. Atourian, J. Astola, T. Saramäki, and V. Lukin, "Unified structure and approach for performing fast transformations and nonlinear operations," in *Proc. 1998 International Conference on Mathematical Methods in Electromagnetic Theory, MMET'98*, Kharkov, Ukraine, June 2–5, 1998, vol. 1, pp. 426–428.

[104] J. Vesma, R. Hamila, T. Saramäki, and M. Renfors, "Design of polynomial interpolation filters based on Taylor series," in *Proc. 9th European Signal Processing Conference, EUSIPCO'98*, Island of Rhodes, Greece, September 8–11, 1998, pp. 283–286.

[105] T. Saramäki and M. Renfors, "Nth band filter design," in in *Proc. 9th European Signal Processing Conference, EUSIPCO'98*, Island of Rhodes, Greece, September 8–11, 1998, pp. 1943–1947.

[106] T. Saramäki and K. Egiazarian, "Discrete-time linear-phase nearly orthogonal wavelet banks," in in *Proc. 9th European Signal Processing Conference, EUSIPCO'98*, Island of Rhodes, Greece, September 8–11, 1998, pp. 1749–1752.

[107] A. Viholainen, T. Saramäki, and M. Renfors, "Cosine-modulated filter bank design for multicarrier VDSL modems," in *Proc. 6th IEEE International Workshop on Intelligent Signal Processing and Communication Systems, ISPACS'98*. Melbourne, Australia, November 4-6, 1998, vol.1, pp. 143–147. **50 citations**.

[108] T. Saramäki and S. K. Mitra, "Design and implementation of narrowband linear-phase FIR filters with piece-wise polynomial impulse response," in *Proc. UCSB Workshop on Signal and Image Processing*, Santa Barabara, California, December 10–11.

[109] R. Bregović and T. Saramäki, "Two-channel FIR filter banks–A tutorial review and new results," in *Proc. Second International Workshop on Transforms and Filter Banks,* Brandenburg and der Havel, Germany, March 5-7 1999, pp. 507–557; published as TICSP Series # 4, March 2000, edited by R. Creutzburg and J. Astola.

[110] H. Johansson and T. Saramäki, "Two-channel filter banks based on the frequency-response masking approach," in *Proc. Second International Workshop on Transforms and Filter Banks,* Brandenburg, Germany, March 5–7 1999, pp. 367–382, published as TICSP Series # 4, March 2000, edited by R. Creutzburg and J. Astola.

[111] J. Vesma, T. Saramäki, and M. Renfors, "Combined matched filter and polynomial-based interpolator for symbol synchronization in digital receivers," in *Proc. 1999 IEEE International Symposium on Circuits and Systems*, Orlando, Florida, May 30–June 2, 1999, vol. 3, pp. 94–97.

[112] H. Johansson and T. Saramäki, "A class of complementary IIR filters," in *Proc. 1999 IEEE International Symposium on Circuits and Systems*, Orlando, Florida, May 30–June 2, 1999, vol. 3, pp. 299–302.

[113] J. Yli-Kaakinen and T. Saramäki, "An efficient algorithm for the design of lattice wave digital filters with short coefficient wordlengh," in *Proc. 1999 IEEE International Symposium on Circuits and Systems*, Orlando, Florida, May 30–June 2, 1999, vol. 3, pp. 443–448.

[114] T. Saramäki and Y. C. Lim, "Use of the Remez algorithm for designing FIR filters utilizing the frequency-response masking approach," in *Proc. 1999 IEEE International Symposium on Circuits and Systems*, Orlando, Florida, May 30–June 2, 1999, vol. 3, pp. 449–455.

[115] T. Saramäki and S. K. Mitra, "Design and implementation of narrowband linear-phase FIR filters with piece-wise polynomial impulse response," in *Proc. 1999 IEEE International Symposium on Circuits and Systems*, Orlando, Florida, May 30–June 2, 1999, vol. 3, pp. 456–461.

[116] T. Saramäki and J. Vesma, "Polynomial-based interpolation for digital signal processing applications," (**an invited plenary talk**) in *Proc. International Conference on Computer Science and Information Technologies, 1999, CSIT-1999*, Yerevan, Armenia, August 17–22, 1999, pp. p120–p129.

[117] A. Viholainen, T. Saramäki, and M. Renfors, "Nearly perfect-reconstruction cosine-modulated filter bank design for VDSL modems," in *Proc. 6th International Conference on Conference on Electronics, Circuits, and Systems, ICECS'99*, Pafos, Cyprus, September 5–8, 1999, vol. 1, pp. 373–376. . **50 citations**

[118] J. Vesma and T. Saramäki, "Design and properties of polynomial-based fractional delay filters," in *Proc. 2000 IEEE International Symposium on Circuits and Systems*, Geneva, Switzerland, May 28–31, 2000, vol. 1, pp. 104–107. **50 citations**

[119] V. V. Lukin and T. Saramäki, "Design and properties of step-like weighting windows," in *Proc. 2000 IEEE International Symposium on Circuits and Systems*, Geneva, Switzerland, May 28–31, 2000, vol. 1, pp. 108–111.

[120] R. Bregović and T. Saramäki, "A new method for the design of two-channel perfect-reconstruction linear-phase FIR filter banks," *Proc. 2000 IEEE International Symposium on Circuits and Systems*, Geneva, Switzerland, May 28–31, 2000, vol. 1, pp. 639–642.

[121] J. Yli-Kaakinen and T. Saramäki, "An algorithm for the design of multiplierless approximately linear-phase lattice wave digital filters," in *Proc. 2000 IEEE International Symposium on Circuits and Systems*, Geneva, Switzerland, May 28–31, 2000, vol. 2, pp. 77–80.

[122] V. V. Lukin and T. Saramäki, "Step-like windows: Synthesis, properties, and applications," in *Proc. First International Workshop on Spectral Methods and Logic Design for Future Digital Systems*, Tampere, Finland, June 2–3, 2000, pp. 155–187; published as TICSP Series # 10, December 2000, edited by R. Creutzburg and K. Egiazarian.

[123] R. Bregović and T. Saramäki, "Iterative methods for designing orthogonal and biorthogonal two-channel FIR filter banks with regularities," in *Proc. First International Workshop on Spectral Methods and Logic Design for Future Digital System*, Tampere, Finland, June 2–3, 2002, pp. 385–407; published as TICSP Series # 10, December 2000, edited by R. Creutzburg and K. Egiazarian.

[124] A. Gotchev, J. Vesma, T. Saramäki, and K. Egiazarian, "Multi-scale image representations based on modified *B*-splines," in *Proc. First International Workshop on Spectral Methods and Logic Design for Future Digital Systems,* Tampere, Finland, June 2–3, 2002, pp. 431–452; published as TICSP Series # 10, December 2000, edited by R. Creutzburg and K. Egiazarian.

[125] A. Gotchev, J. Vesma, T. Saramäki, and K. Egiazarian, "Modified B-spline functions for efficient image interpolation," in *Proc. First Balkan Conference on Signal Processing, Communications, Circuits and Systems,* Istanbul, Turkey, June 2–3, 2000, pp. 241–244.

[126] R. Bregović and T. Saramäki, "An iterative method for designing orthogonal two-channel FIR filter banks with regularities" in *Proc. 2000 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Istanbul, Turkey, June 5–9, 2000, vol. 1, pp. 484–487.

[127] R. Bregović and T. Saramäki, "Design of two-channel low-delay FIR filter banks using constrained optimization," in *Proc. the First International Workshop on Image and Signal Processing and Analysis (IWISPA) in Conjunction with the 22nd International Conference on In-*

formation Technology Interfaces, Pula, Croatia, June 14–15, pp. 223–228.

[128] V. V. Lukin, N. N Ponomarenko, T. Saramäki, and A. A. Zelensky, "Design of 2-D windows for plane antenna pattern statistical optimization under specific requirements," in *Proc. Nordic Signal Processing Symposium, NORSIG2000*, Kolmården, Sweden, June 13–15, pp. 73–76.

[129] J. Vesma, F. Lopez, T. Saramäki, and M. Renfors, "The effects of quantizing the fractional interval in interpolation filters," in *Proc. Nordic Signal Processing Symposium, NORSIG2000*, Kolmården, Sweden, June 13–15, pp. 215–218.

[130] A. Gotchev, J. Vesma, T. Saramäki, and K. Egiazarian, "Digital image resampling by modified *B*-spline functions," in *Proc. Nordic Signal Processing Symposium, NORSIG2000*, Kolmården, Sweden, June 13–15, pp. 259–262.

[131] A. Gotchev, K. Egiazarian, and T. Saramäki, "A multiresolution approach to closed glottis interval determination," in *Proc. X European Signal Processing Conference, EUSIPCO 2000*, Tampere, Finland, September 4–8, 2000, vol. 1, pp. 199–202.

[132] T. Saramäki and J. Yli-Kaakinen, "Design digital filters and filter banks by optimization: Applications," (**an invited tutorial talk**) in *Proc. X European Signal Processing Conference, EUSIPCO 2000,* Tampere, Finland, September 4–8, 2000, vol. 1, pp. 355–356. A 32-pages long two-column article [Online.] Available: http://www.cs.tut.fi/~ts/sldsp_part6_article.pdf

[133] R. Bregović and T. Saramäki, "A general-purpose optimization technique for designing two-channel FIR filter banks," in *Proc. X European Signal Processing Conference, EUSIPCO 2000*, Tampere, Finland, September 4–8, 2000, vol. 1, pp. 369–372.

[134] I. Saastamoinen, T. Saramäki, and O. Vainio, "VHDL-based implementations of area and power efficient filter architectures" in *Proc. X European Signal Processing Conference, EUSIPCO 2000*, Tampere, Finland, September 4–8, 2000, vol. 1, pp. 199–202, vol. 1, pp. 1705–1708.

[135] O. Vainio and T. Saramäki, "Predictive integration of polynomial signals," in *Proc. 7th Biennial Conference on Electronics and Microsystem Technology,* Tallinn, Estonia, October 8–11, 2000, pp. 99–102.

[136] T. Saramäki, "Efficient DSP algorithms and their optimization for practical applications as well as for VLSI and signal processor implementations", **invited three-hour lectures** given at the *first IEEE South-American Workshop on Circuits and Systems (SAWCAS'2000)*, Rio de Janeiro, Brazil, November 20–22, 2000, Bahia Blanka, Argentina, November 22–24, 2000: T. Saramäki and J. Yli-Kaakinen, "Design of digital filters and filter banks by optimization: Applications", 32 two-column pages, included in the CD-ROM. [Online.] Available: http://www.cs.tut.fi/~ts/sldsp_part6_article.pdf

[137] R. Bregović and T. Saramäki, "A systematic technique for designing prototype filters for perfect-reconstruction cosine- modulated and modified DFT filter banks," in *Proc. 2001 IEEE International Symposium on Circuits and Systems*, Sydney, Australia, May 6–9, 2001, vol. 2, pp. 33–36.

[138] A. Hjørungnes and T. Saramäki, "Minimum mean square error quantizers with uncorrelated input and quantization noise," in *Proc. 2001 IEEE International Symposium on Circuits and Systems*, Sydney, Australia, May 6–9, 2001, vol. 2, pp. 129–132.

[139] T. Saramäki and H. Johansson, "Optimization of FIR filters using the frequency-response masking approach," in *Proc. 2001 IEEE International Symposium on Circuits and Systems*, Sydney, Australia, May 6–9, 2001, vol. 2, pp. 177–180. **51 citations**

[140] J. Yli-Kaakinen and T. Saramäki, "A systematic algorithm for the design of multiplierless FIR filters," in *Proc. 2001 IEEE International Symposium on Circuits and Systems*, Sydney, Australia, May 6–9, 2001 vol. 2, pp. 185–188. **65 citations**

[141] A. Gotchev, K. Egiazarian, J. Vesma, and T. Saramäki, "Edge-preserving image resizing using modified B-splines," in *Proc. 2001 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Salt Lake City, Utah, May 7–11 2001, vol. 3, pp. 1865–1868.

[142] A. Hjørungnes s and T. Saramäki, "Minimum mean square error nonuniform FIR filter banks," in *Proc. 2001 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Salt Lake City, Utah, May 7–11 2001, vol. 6, pp. 3609–3612.

[143] T. Saramäki and R. Bregović , "An efficient approach for designing nearly perfect-reconstruction cosine-modulated and modified DFT filter banks," in *Proc. 2001 IEEE International Conference on Acoustics,*

Speech, and Signal Processing, Salt Lake City, Utah, May 7–11, 2001, vol. 6, pp. 3617–3620.

[144] G. Marchokov, A. Gotchev, J. Vesma, T. Saramäki, and K. Egiazarian, "Optimized polynomial kernels for efficient image interpolation," in *Proc. International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP'2001*, Pula, Croatia, June 16–18, 2001, pp 147–153, published as TICSP Series # 13, June 2001, edited by T. Saramäki, K. Egiazarian, and J. Astola.

[145] M. Bhattacharya, T. Saramäki, and J. Astola, "Multiplierless realization of recursive digital filters," in *Proc. 2nd International Symposium on Image and Signal Processing and Analysis, ISPA 2001*, Pula, Croatia, June 19–21, 2001, pp. 469–474.

[146] R. Bregović and T. Saramäki, "Design of causal stable perfect reconstruction two-channel IIR filter banks", in *Proc. the 2nd International Symposium on Image and Signal Processing and Analysis, ISPA 2001*, Pula, Croatia, June 19–21 2001, pp. 545–550.

[147] M. Bhattacharya, J. Astola, and T. Saramäki, "Multiplierless implementation of recursive digital filters using a class of low sensitivity structures," in *Proc. Sixth International Symposium on Signal Processing and its Applications, ISSPA 2001*, Kuala Lumpur, Malaysia, August 13–16, 2001, vol. 2, pp. 611–614.

[148] T. Saramäki and R. Bregović, "An efficient approach for designing nearly perfect-reconstruction low-delay cosine-modulated filter banks," *Proc. International Conference on Computer Science and Information Technologies, 1999, CSIT-1999*, Yerevan, Armenia), September 17–20, 2001, 4 pages.

[149] J. Yli-Kaakinen and T. Saramäki, "An algorithm for the optimization of pipelined recursive digital filters," in Proc. *15th European Conference on Circuit Theory and Design, ECCTD'01*, Helsinki, Finland, August 28–31, 2001, vol.2, pp. 225–228.

[150] G. Marchokov, A. Gotchev, J. Vesma, T. Saramäki, and K. Egiazarian, "Efficient polynomial-based methods for image resizing" in *Proc. the 3rd International Conference on Information, Communications and Signal Processing, ICICS 2001*, Singapore, October 15–18 ,2001, 5 pages.

[151] M. Bhattacharya and T. Saramäki, "Multiplierless implementation of bandpass and bandstop IIR digital filters," in *Proc. 2002 IEEE International Conference on Acoustics, Speech and Signal Processing*, Orlando, Florida, May 13–17, 2002, vol. 3,pp. 3184–3187.

[152] R. Bregović and T. Saramäki, "An efficient approach for designing nearly perfect-reconstruction low-delay cosine-modulated filter banks," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 26–29, 2002, vol. 1, pp. 825–828.

[153] M. Bhattacharya and T. Saramäki, "Multiplierless implementation of bandpass and bandstop recursive digital filters," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 16-19, 2002, vol. 2, pp. 692–695.

[154] M. Bhattacharya and T. Saramäki, "Multiplierless implementation of all-pole digital filters," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 16-19, 2002, vol. 2, pp. 696–699.

[155] T. Saramäki and J. Yli-Kaakinen, "Optimization of frequency- response-masking based FIR filters with reduced complexity," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 16-19,2002, vol. 3, pp. 225–228.

[156] P. Arian, T. Saramäki, and S. K. Mitra "A systematic technique for optimizing multiple branch FIR filters for sampling rate conversion," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 16-19, 2002, vol.4 , pp 1–4.

[157] D. Babić, J. Vesma, T. Saramäki, and M. Renfors. "Implementation of the transposed Farrow structure," in *Proc. 2002 IEEE International Symposium on Circuits and Systems*, Scottsdale, Arizona, May 16-19, 2002, vol. 4, pp. 5–8.

[158] A. Gotchev, K. Egiazarian, and T. Saramäki, "On comparison of optimized spline-based image interpolators," in *Proc. the International Conference on Computer Systems and Technologies (e-Learning) - CompSysTech'2002)*, June 20-21, 2002, pp. 1–6.

[159] M. Bhattacharya and T. Saramäki, "Multiplierless implementation of all-pole digital filters using a low-sensitivity structure," in *Proc. XI European Signal Processing Conference, EUSIPCO 2002,* Toulouse, France, September 3–6, 2002, vol. 1, pp. 687–690.

[160] T. Saramäki and M. Bhattacharya, "Multiplierless implementation of bandpass and bandstop recursive digital filters using low-sensitivity transformation," in *Proc. XI European Signal Processing Conference,*

*EUSIPCO 2002*Toulouse, France, September 3–6, 2002, vol. 1, pp. 691–694.

[161] R. Bregović and T. Saramäki, "Design and properties of two- channel FIR filter banks optimized by using peak-constrained least squares optimization criterion," in *Proc. International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP '2002*, Toulouse, France, September 7–8, 2002, pp. 33–39, published as TICSP Series #17, September 2002, edited by T. Saramäki, K. Egiazarian, and J. Astola.

[162] D. Babić', T. Saramäki, and M. Renfors, "Conversion between arbitrary sampling rates using polynomial-based interpolation filters," in *Proc. International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP '2002*, Toulouse, France, September 7–8, 2002, pp. 57–64, published as TICSP Series #17, September 2002, edited by T. Saramäki, K. Egiazarian, and J. Astola.

[163] A. Gotchev, G. Marchokov, T. Saramäki, and K. Egiazarian, "Efficient algorithms and structures for image size reduction," in *Proc. International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP '2002*, Toulouse, France, September 7–8, 2002, pp. 251–258, published as TICSP Series #17, September 2002, edited by T. Saramäki, K. Egiazarian, and J. Astola.

[164] T. Saramäki and J. Yli-Kaakinen, "Multiplier-free polynomial-based FIR filters with an adjustable fractional delay," in *Proc. the 9th IEEE International Conference on Electronics, Circuits and Systems, ICECS 2002*, Dubrovnik, Croatia, September 15–18, 2002, vol. 3, pp. 1167–1170.

[165] A. Gotchev, K. Egiazarian, and T. Saramäki, "Comparing the performance of optimized piece-wise polynomial image interpolators," in *Proc. 5th Nordic Signal Processing Symposium, NORSIG 2002*, on board Hurtigruten, Norway, October 4–7, 2002, 5 pages.

[166] Lj. Milić and T. Saramäki, "Complementary IIR filter pairs with an adjustable crossover frequency," in *Proc. 5th Nordic Signal Processing Symposium, NORSIG 2002*, on board Hurtigruten, Norway, October 4–7, 2002,6 pages.

[167] O. Vainio and T. Saramäki, "Piecewise-polynomial approximation for raised-cosine filters," in *Proc. 5th Nordic Signal Processing Symposium, NORSIG 2002*, on board Hurtigruten, Norway, October 4–7, 2002, 4 pages.

[168] T. Saramäki, "Polynomial-based interpolation for signal processing and telecommunication applications," a plenary talk, in *Proc. X Telecommunications Forum, TELFOR 2002*, Belgrade, Yugoslavia, November 26-28, 2002, p. 433.

[169] Lj. Milić and T. Saramäki, "Power-complementary IIR filter pairs with an adjustable crossover frequency," in *Proc. X Telecommunications Forum, TELFOR 2002*, Belgrade, Yugoslavia, November 26-28, 2002, pp. 434–437.

[170] T. Saramäki, "Design of digital filters and filter banks by optimization: Applications," (**a plenary talk**), in *Proc. X Telecommunications Forum, TELFOR 2002*, Belgrade, Yugoslavia, November 26-28, 2002, p. 462.

[171] T. Saramäki and M. Bhattacharya, "Multiplierless realization of recursive digital filters using allpass structures," in *Proc. 2003 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Hong Kong, April 5-10, 2003, vol. 2, pp. 505–508.

[172] M. Bhattacharya and T. Saramäki, "Some observations leading to multiplierless implementation of linear phase FIR filters," in *Proc. 2003 IEEE International Conference on Acoustics, Speech, and Signal Processing*, Hong Kong, April 5-10, 2003, vol. 2, pp. 517–520.

[173] Y. J. Yu, T. Saramäki, and Y. C. Lim, "An iterative method for optimizing FIR filters synthesized using the two-stage frequency- response masking technique," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 3, pp. 874–877.

[174] W.-S. Lu, R. Bregović, and T. Saramäki, "Efficient design of perfect-reconstruction biorthogonal cosine-modulated filter banks using convex Lagrangian relaxation and alternating null-space projections," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 141–144.

[175] L. Milić and T. Saramäki, "Three classes of IIR complementary filter pairs with an adjustable crossover frequency," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 145–148.

[176] M. Bhattacharya and T. Saramäki, "Some observations on multiplierless implementation of linear phase FIR filters," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 193–196.

[177] P. Arian and T. Saramäki, "A systematic technique for optimizing one-stage two-filter linear-phase FIR filters for sampling rate conversion," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 197–200.

[178] M. Bhattacharya and T. Saramäki, "Allpass structures for multiplierless realization of recursive digital filter," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 237–240.

[179] M. Bhattacharya and T. Saramäki, "Multiplierless implementation of bandpass and bandstop recursive digital filters using allpass structures," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 249–252.

[180] D. Babić', T. Saramäki, and M. Renfors, "Prolonged transposed polynomial-based filters for decimation," in *Proc. 2003 IEEE International Symposium on Circuits and Systems*, Bangkok, Thailand, May 25-28, 2003, vol. 4, pp. 317–320.

[181] R. Bregović and T. Saramäki, T, "A systematic technique for designing linear-phase FIR prototype filters for perfect-reconstruction cosine-modulated and modified filter banks," in *Proc. the 2003 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2003*, Barcelona, Spain, September 13 - 14, 2003, published as TICSP Series #22, September 2003,edited by K. Egiazarian, T. Saramäki, and J. Astola,.

[182] A. Gotchev, K. Egiazarian, G. Marchokov, and T. Saramäki, "A near least squares method for image decimation," in *Proc. 2003 IEEE International Conference on Image Processing, ICIP 2003*, Barcelona, Catalonia, Spain, September 14-18, 2003, vol. 2, pp. 929–932.

[183] B. Soltanian, T. Saramäki, and H. Johansson "Design of optimum recursive digital filters with double zeros on the unit circle leading to symmetric ladder wave digital filter structures," in *Proc. 3rd Symposium on Image and Signal Processing and Analysis, ISPA 2003*, Rome, Italy, September 18–20, 2003, vol. 1, pp. 44–49.

[184] R. Bregović and T. Saramäki, "Design of linear-phase two- channel FIR filter banks with rational sampling factors," in *Proc. 3rd Symposium on Image and Signal Processing and Analysis, ISPA 2003*, Rome, Italy, September 18–20, 2003, vol. 2, pp. 749–764.

[185] P. Martin, F. Cruz-Roldan, and T. Saramäki, "A windowing approach for designing critically sampled nearly perfect-perfect- reconstruction cosine-modulated transmultiplexers and filter banks," in *Proc. 3rd Symposium on Image and Signal Processing and Analysis, ISPA 2003*, Rome, Italy, September 18–20, 2003, vol. 2, pp. 755–760.

[186] A. Gotchev, K. Egiazarian, and T. Saramäki, "Least squares image resizing," in *Proc. XVIII International Scientific Conference on Information, Communication and Energy Systems and Technologies, ICEST 2003*, Sofia, Bulgaria, October 16-18, 2003, pp. 209–217.

[187] J. Yli-Kaakinen and T. Saramäki, "A systematic algorithm for the design of multiplierless lattice wave digital filters," in *Proc. First International Symposium on Control, Communications and Signal Processing, IS-CCSP 2004*, Hammamet, Tunisia, March 21–24, 2004, pp. 393–396.

[188] J. Yli-Kaakinen, T. Saramäki, and R. Bregović, "An algorithm for the design of multiplierless two-channel perfect reconstruction orthogonal lattice filter banks," in *Proc. First International Symposium on Control, Communications and Signal Processing, ISCCSP 2004*, Hammamet, Tunisia, March 21–24, 2004, pp. 415–418.

[189] T. Saramäki and J. Yli-Kaakinen, "A systematic technique for designing multiplierless lattice wave digital filters and FIR filters," in *Proc. 6th International Conference on Digital Signal Processing and its Applications, DSPA 2004*, Moscow, Russia, March 31–April 2, 2004, pp. 104–105.

[190] Y. Zou and T. Saramäki, "Design of computationally efficient narrowband linear-phase FIR filters," in Proc. *12th IEEE Mediterranean Electrotechnical Conference, MELECON 2004*, Dubrovnik, Croatia, May 12–15, 2004, pp. 255–259.

[191] J. Yli-Kaakinen and T. Saramäki, "An algorithm for the optimization of adjustable fractional-delay all-pass filters," in *Proc. 2004 IEEE International Symposium on Circuits and Systems*, Vancouver, Canada, May 23–26, 2004, vol. 3, pp. 153–156.

[192] M. B. Furtado, Jr., P. S. R. Diniz, S. L. Netto, and T. Saramäki, "Time-domain constraints for the design of FRM-based cosine- modulated and modified DFT filter banks with large number of bands and zero inter-symbol interference," in *Proc. 2004 IEEE International Symposium on*

Circuits and Systems, Vancouver, Canada, May 23-26, 2004, vol. 3, pp. 189–192, May 23–26, 2004.

[193] P. Martin, F. Cruz-Roldan, and T. Saramäki, "A new window for the design of cosine-modulated multirate systems," in *Proc. 2004 IEEE International Symposium on Circuits and Systems*, Vancouver, Canada, May 23–26, 2004, vol. 3, pp. 529–532, May 23-26, 2004.

[194] J. Yli-Kaakinen, T. Saramäki, and Y. J. Yu, "An efficient algorithm for the optimization of FIR filters synthesized using the multistage frequency-response masking approach," in *Proc. 2004 IEEE International Symposium on Circuits and Systems*, Vancouver, Canada, May 23–26, 2004, vol. 5, pp. 540–543.

[195] R. Bregović and T. Saramäki, "Design of two-channel FIR filterbanks with rational factors by using the frequency-response masking technique," in *Proc. 2004 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2004*, Vienna, Austria, September 11–12, 2004, pp. 27–34, published as TICSP Series #25, September 2004, edited by J. Astola, K. Egiazarian, and T. Saramäki.

[196] P. Arian, T. Saramäki, and A. T. Fam, "Generalized linear- phase FIR filters based on switching and resetting of IIR filters," in *Proc. International Conference on Signals and Electronic Systems, ICSES'04*, Poznan, Poland, September 13–15, 2004, pp. 39–42.

[197] P. Arian, T. Saramäki, and S. K. Mitra, "Improving multiple-branch FIR filter structures through constrained optimization," in *Proc. 22nd Nochip Conference*, Oslo, Norway, November 8–9, 2004, pp. 163–166.

[198] P. Arian, T. Saramäki, and A. T. Fam, "A new class of linear-phase FIR filters based on switching and resetting of IIR filters," in *Proc. 22nd Norchip Conference*, Oslo, Norway, November 8–9, 2004, pp. 167–170.

[199] P. Arian, T. Saramäki, and A. T. Fam, "Design of IIR-like filter blocks in cascade for generating narrow transition-band linear-phase FIR filters," in *Proc. TENCON 2004 - 2004 IEEE Region 10 Conference*, Chiang Mai, Thailand, Nov. 21–24, vol. A, pp. 60–63.

[200] P. Arian, T. Saramäki, and A. T. Fam, "Implementation of IIR-like filter blocks in cascade for generating narrow transition-band linear-phase FIR filters," in *Proc. TENCON 2004 - 2004 IEEE Region 10 Conference*, Chiang Mai, Thailand, Nov. 21–24, vol. A, pp. 64–67.

[201] T. Saramäki, Design of digital filters and filter banks by optimization: Applications, in *Proc. 7th International Conference and Exhibition on Digital Signal Processing and its Applications, DSPA 2005*, Moscow, Russia, March16–18, 2005 p. 6.

[202] B. Dumitrescu, R. Bregović , and T. Saramäki, "Simplified design of low-delay oversampled NPR GDFT filterbanks," in *Proc. 2005 IEEE Conference on Acoustics, Speech, and Signal Processing*, Pennsylvania, Philadelphia, March 18–23, 2005, vol. 4, pp. 525–528.

[203] M. Bhattacharya and T. Saramäki, "Multiplierless realization of bandpass and bandstop digital filters transformed from all-pole lowpass filters," in *Proc. 2005 IEEE Conference on Acoustics, Speech, and Signal Processing*, Pennsylvania, Philadelphia, March 18–23, 2005, vol. 5, pp. 113–116.

[204] P. Martin-Martin, F. Cruz-Roldan, and T. Saramäki, "Optimized transmultiplexers for multirate systems," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 2, pp. 1106–1109.

[205] R. Bregović , Y. C. Lim, and T. Saramäki, "Design of two-channels FIR filterbanks with rational sampling factors using the FRM technique," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 2, pp. 1098–1101.

[206] J. Yli-Kaakinen and T. Saramäki, "Design and implementation of multiplierless adjustable fractional-delay all-pass filters," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 2, pp. 1827–1830.

[207] P. Arian, T. Saramäki, and A. T. Fam, "A decomposition technique for cascaded IIR-like filter blocks generating linear-phase FIR filters," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 3, pp. 2008–2011.

[208] R. Lehto, T. Saramäki, and O. Vainio, "Synthesis of narrow- band linear-phase FIR filters with a piecewise-polynomial impulse response," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 3, pp. 2012–2015.

[209] M. Bhattacharya and T. Saramäki, "Fourth-order structures for multiplierless realizations on bandpass and bandstop digital filters transformed from all-pole lowpass filters," in *Proc. 2005 IEEE International Symposium on Circuits and Systems*, Kobe, Japan, May 23–26, 2005, vol. 3, pp. 2599–2602.

[210] P. Arian, T. Saramäki, and A. T. Fam, "An alternative approach for generating linear-phase FIR filters from IIR-like filter blocks in cascade," in *Proc. Third International IEEE Northeast Workshop on Circuits and Systems, IEEE-NEWCAS 2005*, Québec City, Canada, June 19–22, 2005, pp. 349–352.

[211] B. Dumitrescu, R. Bregović , and T. Saramäki, "On an iterative method to design oversampled GDFT filterbanks," in *Proc. the 2005 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2005*, Riga, Latvia, June 20–22, 2005, pp. 1–6, published as TICSP Series #30, June 2005, edited by J. Astola, K. Egiazarian, and T. Saramäki.

[212] R. Bregović, Y. C. Lim, and T. Saramäki, "Frequency response masking based design of two-channel FIR filterbanks with rational sampling factors," in *Proc. the 2005 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP2005*, Riga, Latvia, June 20–22, 2005, pp. 11–18, published as TICSP Series #30, June 2005, edited by J. Astola, K. Egiazarian, and T. Saramäki.

[213] A. Boev, C. Kalchev, A. Gotchev, T. Saramäki, and K. Egiazarian, "Efficient motion estimation utilizing quadrature filters," in *Proc. 13th European Conference on Signal Processing, EUSIPCO 2005*, Antalya, Turkey, September 4–8, 4 pages.

[214] R. Bregović , Y. C. Lim, and T. Saramäki, "Frequency response masking based design of two-channel FIR filterbanks with rational sampling factors and reduced implementation complexity," in *Proc. Fourth International Symposium on Image and Signal Processing and Analysis, ISPA 2005*, Zagreb, Croatia, September 15–17, 2005 , pp. 121–126.

[215] P. Martin-Martin, F. Cruz-Roldan, and T. Saramäki, "A novel approach for designing cosine-modulated transceivers," in *Proc. Fourth International Symposium on Image and Signal Processing and Analysis, ISPA 2005*, Zagreb, Croatia, September 15–17, 2005, pp. 151–156.

[216] J. Yli-Kaakinen and T. Saramäki, "A systematic algorithm for designing multiplierless computationally efficient recursive decimators and interpolators," in *Proc. Fourth International Symposium on Image and Signal Processing and Analysis, ISPA 2005*, Zagreb, Croatia, September 15–17, 2005, pp. 167–172.

[217] P. Arian, T. Saramäki, and A. T. Fam, "Unstable IIR-like filter blocks for generating linear-phase FIR filters: A noise analysis," in *Proc. TENCON, 2005 - 2005 IEEE Region 10 Conference*, Melbourne, Australia, November 21–24, 2005, 4 pages.

[218] T. Saramäki, "Efficient techniques for image resampling" (**a plenary talk**) in *Proc. EUROCON 2005 - The International Conference on "Computer as a Tool"*, Belgrade, Serbia and Montenegro, November 21–24, 2005, p. 3.

[219] S. Damjanovic, Lj. Milić, and T. Saramäki, "Frequency transformations in two-band wavelet IIR filter banks," in *Proc. EUROCON 2005 - The International Conference on "Computer as a Tool"*, Belgrade, Serbia and Montenegro, November 21–24, pp. 88–91.

[220] J. Yli-Kaakinen and T. Saramäki, "An efficient structure for FIR filters with an adjustable fractional delay," *in Proc. 8th International Conference on Digital Signal Processing and its Applications, DSPA 2006*, Moscow, Russia, March 29-31, 2006, pp. 617–623.

[221] R. Lehto, T. Saramäki, and O. Vainio, "Formulas to generate efficient piecewise-polynomial implementations of narrowband linear-phase FIR filters," in *Proc. 2006 IEEE International Symposium on Circuits and Systems*, Kos Island, Greece, May 21–24, 2006, pp. 2513–2516.

[222] J. Yli-Kaakinen and T. Saramäki, "Approximately linear-phase recursive digital filters with variable magnitude characteristics," in *Proc. 2006 IEEE International Symposium on Circuits and Systems*, Kos Island, Greece, May 21–24, 2006, pp. 5227–5230.

[223] R. Bregović , T. Saramäki, Y. J. Yu, and Y. C. Lim, "An efficient implementation of linear-phase FIR filters for a rational sampling rate conversion," in *Proc. 2006 IEEE International Symposium on Circuits and Systems*, Kos Island, Greece, May 21–24, 2006, pp. 5395–5398.

[224] J. Yli-Kaakinen and T. Saramäki, "Efficient recursive digital filters with variable magnitude characteristics," in *Proc. 7th Nordic Signal Processing Symposium, NORSIG 2006*, Reykjavik, Iceland, June 7–9, 2006, pp. 30–33.

[225] R. Bregović, B. Dumitrescu, T. Saramäki, and R. Niemistö, "A Kaiser window approach for designing nonuniform oversampled M-channel filterbanks," in *Proc. the 2006 International TICSP Workshop on Spectral Methods and Multirate Signal Processing, SMMSP 2006*, Florence, Italy, September 2–3, 2006, pp. 15–21, publishes as TICSP Series #34, June 2006, edited by J. Astola, K. Egiazarian, and T. Saramäki.

[226] B. Dumitrescu, R. Bregović, T. Saramäki, and R. Niemistö, "Low-delay nonuniform oversampled filterbanks for acoustic echo control," in *Proc. 14th European Signal Processing Conference, EUSIPCO 2006*, Florence, Italy, September 4–8 2006, 4 pages.

[227] F. Cruz-Roldán, P. Martín-Martín, M. Blanco-Velasco, and T. Saramäki, "A fast windowing technique for designing discrete wavelet multitone transceivers exploiting spline functions," in *Proc. 14th European Signal Processing Conference, EUSIPCO 2006*, Florence, Italy, September 4–8, 2006, 5 pages.

[228] V. I Anzova, J. Yli-Kaakinen, and T. Saramäki, "An algorithm for the design of multplierless IIR filters as a parallel connection of two all-pass filters," in *Proc. IEEE Asia Pacific Conference on Circuits and Systems, APCCAS 2006*, Singapore, December 4–7, 2006, pp. 744–747.

[229] Lj. Milić, T. Saramäki, and R. Bregović, "Multirate filters: An overview," in *Proc. IEEE Asia Pacific Conference on Circuits and Systems, APCCAS 2006*, Singapore, December 4–7, 2006, pp. 912–915.

[230] T. Saramäki and J. Yli-Kaakinen, "A novel systematic approach for synthesizing multiplication-free highly-selective FIR half-band decimators and interpolators," in *Proc. IEEE Asia Pacific Conference on Circuits and Systems, APCCAS 2006*, Singapore, December 4–7, 2006, pp. 920–923.

[231] O. Vainio, R. Lehto, and T. Saramäki, "Fractional-order FIR differentiators with optimum noise attenuation," in *Proc. 2007 IEEE Instrumentation and Measurement Technology Conference, IMTC 2007*, Warsaw, Poland, May 1–3, 2007, 4 pages.

[232] R. Lehto, T Saramäki, and O. Vainio, "Synthesis of wideband linear-phase FIR filters with a piece-polynomial-sinusoidal impulse response," in *Proc. 2007 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 27–30, 2007, pp. 2052–2055.

[233] Y. C Lim, Y. J. Yu, K. L. Teo, and T. Saramäki, "FRM-based FIR filters with minimum coefficient sensitivities," in *Proc. 2007 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 27–30, 2007, pp. 2962–2965.

[234] J. Yli-Kaakinen and T. Saramäki, "A simplified structure for FIR filters with an adjustable fractional delay," in *Proc. 2007 IEEE International Symposium on Circuits and Systems*, New Orleans, Louisiana, May 27–30, 2007, pp. 3439–3442.

[235] R. Bregović, B. Dumitrescu, and T. Saramäki, "An efficient method for designing low-delay nonuniform oversampled M-channel filterbanks," in *Proc. Fifth International Symposium on Image and Signal Processing and Analysis, ISPA 2007*, Istanbul, Turkey, September 27–29, 2007, pp. 58–62.

[236] R. Lehto, T. Saramäki, and O. Vainio, "Hilbert transformers with a piecewise-polynomial-sinusoidal impulse response," in *Proc. 2008 IEEE International Symposium on Circuits and Systems*, Seattle, Washington, May 18–21, 2008, pp 2450–2453.

[237] P. Martín Martín, R. Bregović, and T. Saramäki, "An efficient approach for designing filter banks for multi-carrier transmission," in *Proc. 2008 IEEE International Symposium on Circuits and Systems*, Seattle, Washington, May 18–21, 2008, pp 3206–3209.

[238] K. Zbaida, R. Bregović, and T. Saramäki, "Design of two-channel IIR filterbanks with rational sampling factors," Proc. the 15th IEEE International Conference on Electronics, Circuits and Systems, ICECS 2008, St. Julian's; Malta, August 31–September 3, 2008, pp 838–841.

[239] M. Ahsan and T. Saramäki, "A MATLAB based optimum multiband fir filters design program following the original idea of the Remez multiple exchange algorithm," in *Proc. 2009 IEEE International Symposium on Circuits and Systems*, Taipei, Taiwan, May 24–27, 2009, pp. 289–292.

[240] R. Lehto, T. Saramäki, O. Vainio, and S. K. Mitra, "Synthesis of narrowband differentiators with a piecewise-polynomial impulse response with parallel-branch structures," in *Proc. 6th International Symposium on Image and Signal Processing and Analysis, ISPA 2009*, Salzburg, Austria, September 16–18, 2009, pp. 760–765.

[241] T. Saramäki and J. Yli-Kaakinen, "An improved approach for the synthesis of multiplication-free highly-selective FIR half-band decimators and interpolators," in *Proc. the 2009 12th International Symposium on Integrated Circuits (ISIC 2009)*, Singapore, December 14–16, 2009, pp. 195–202.

[242] A. Eghbali, H. Johansson, T. Saramäki, and P. Löwenborg, "On the design of adjustable fractional delay FIR filters using digital differentiators," in *Proc. 2010 International Conference on Green Circuits and Systems (ICGCS)*, Shanghai, China, June 21–23, 2010, pp. 289–292.

[243] M. Ahsan and T. Saramäki, "A MATLAB based optimum multiband fir filters design program following the original idea of the Remez multiple exchange algorithm," in *Proc. 2011 IEEE International Symposium on Circuits and Systems*, Rio de Janeiro, Brazil, May 15–17, 2011, pp. 137–140.

[244] A. Eghbali, H. Johansson, and T. Saramäki, "A new structure for reconfigurable two-stage Nyquist pulse shaping filters," in *Proc. 2011 IEEE 54th International Midwest Symposium on Circuits and Systems (MWSCAS)*, Seoul, South Korea, August 7–10, 2011, 4 pages.

[245] M. Ahsan, T. Saramäki, and M, Gabbouj, "A novel technique to design optimum FIR digital filters with different transition bandwidths," *Proc. 56th International Symposium ELMAR-2014*, Zadar, Croatia, September 12–14, 2012, pp. 125–128.

[246] T. Saramäki, M. Ahsan, H. Liedes, and M. Renfors, "A generalized class of lattice wave digital filters, in *Proc. 8th International Symposium on Image and Signal Processing and Analysis. ISPA 2013*, Trieste, Italy, September 4-6, 2013, 6 pages.

[247] T. Saramäki, M. Ahsan, H. Liedes, and M. Renfors, "A generalized class of lattice wave digital filters, in Proc. *8th International Symposium on Image and Signal Processing and Analysis, ISPA 2013*, September 4-6, 2013, Trieste, Italy, 6 pages.

PATENTS

[1] T. Saramäki, T. Ritoniemi, V. Eerola, T. Husu, E. Pajarre, and S. Ingalsuo, "Decimation Filter," United States Patent 5,689,449, 18. 11. 1997 (Also patents in the most important European and Asian countries. This patent has been used world-wide in many commercial products); "Desimointisuodatin," Patent No 96255, Finland, 27.05.1996.

[2] E. Pajarre, V. Eerola, T. Saramäki, T. Ritoniemi, T. Husu, and S. Ingalsuo, "Calculation of a scalar product in a direct-type FIR filter," United States Patent 6,131,105, October 10, 2000 (Also patents in the most important European and Asian countries. This patent has been used world-wide in many commercial products.); "Suora FIR suodatin, menetelmä pistetulon laskemiseksi FIR-suodattimessa ja menetelmä suoran FIR-suodattimen suunnittelemiseksi," Patent No 97002, Finland, 25.09.1996).

[3] T. Saramäki, T. Ritoniemi, V. Eerola, T. Husu, E. Pajarre,and S. Ingalsuo, "Method and arrangement in a transposed digital FIR filter for multiplying a binary input signal with tap coefficients and a method for designing a transposed digital filter," United States Patent 6,370,556, April 9, 2002 (Also patents in the most important European and Asian countries) This patent has been used world-wide in many commercial products.); "Menetelmä ja järjestely transponoidussa digitaalisessa FIR-suodattimessa binäärisen sisääntulosignaalin kertomiseksi tappikertoimilla sekä menetelmä transponoidun digitaalisen suodattimen suunnittelemiseksi," Patent No 96256, Finland, 27.05.1996.

NATIONAL CONFERENCE ARTICLES

[1] T. Saramäki and Y. Neuvo, "High performance equiripple amplitude and group delay digital filters," in *Proc. X National Convention on Radio Science*, Oulu, Finland, October 9–10, 1980, pp. 71–74.

[2] T. Saramäki, "High attenuation recursive digital filters," in Proc. X National Convention on Radio Science, Oulu, Finland, pp. 75–78, October 9–10, 1980, pp. 75–78.

[3] K.-P. Estola and T. Saramäki, "A new approach to remove distortions from ECG data," in Proc. *XI National Convention on Radio Science*, Otaniemi, Espoo Finland, October 19–20, 1983, pp. B36-1–B36-4.

[4] T. Saramäki and Y. Neuvo, "Efficient 2-D FIR filters," *in Proc. Finnish Artificial Intelligence Symposium*, Otaniemi, Espoo Finland, August 20–23, 1984, pp. 184–192.

[5] T. Ritoniemi, H. Tenhunen, M. Lindell, C. Vargas, and T. Saramäki, "Oversampled sigma-delta modulation for efficient analog to digital conversion in VLSI systems," in *Proc. XIII National Convention on Radio Science*, Oulu, Finland, November 3, 1987, p. B2.3.

[6] H. Palomäki, T. Saramäki, and H. Tenhunen, "Multistage digital decimators for VLSI signal processing," in *Proc. XIV National Convention on Radio Science*, Otaniemi, Espoo, Finland; October 17–18, 1988, page. II/4.

[7] T. Karema, H. Palomäki, T. Ritoniemi, T. Saramäki, and H. Tenhunen, "An oversampled analog-to-digital conversion technique," in *Proc. IV*

Finnish Conference on Physics in Industry, Tampere, Finland, September 28–29, 1988, pp. 17–32.

[8] H. Ridha, J. Vesma, T. Saramäki, and M. Renfors, "Derivative approximations for sampled signals based on polynomial interpolation," in *Proc. 1997 Finnish Signal Processing Symposium*, Pori, Finland, May 22, 1997, pp. 42–45.

[9] J. Vesma, H. Ridha, T. Saramäki, and M. Renfors, "Signal analysis via polynomial interpolation," in *Proc. XXII Convention on Radio Science*, Oulu, Finland, November 20–21, 1997, pp. 103–104.

[10] J. Vesma, H. Ridha, T. Saramäki, and M. Renfors, "Polynomial-based interpolator for symbol synchronization and matched filtering in digital receivers," in *Proc. 1999 IEEE Finnish Signal Processing Symposium*, Oulu, Finland, May 31, 1999, pp. 74–78.

[11] A. Kabanov, V. Lukin, and T. Saramäki, "Optimization of convolution window responses under restrictions using a randomization procedure," in *Proc. 1999 IEEE Finnish Signal Processing Symposium*, Oulu, Finland, May 31, 1999, pp. 286–290.

[12] J. Vesma, T. Saramäki, and M. Renfors, "Polynomial-based interpolator for symbol synchronization and matched filtering in digital receivers," in *Proc. URSI/IEEE XXIV National Convention on Radio Science*, Turku, Finland; October 4–5, 1999, pp. 108–109.

LABORATORY REPORTS

[1] T. Saramäki and Y. Neuvo, "Recursive digital filters with analytically solvable poles," Tampere University of Technology, Electronics Laboratory, Research Report No. 37, 1979, 13 pages.

[2] T. Saramäki and T. Honkanen, "Tables for the poles of all-pole maximally flat and equiripple digital filters," Tampere University of Technology, Electronics Laboratory, Research Report No. 38, 1979, 28 pages.

[3] T. Saramäki, "Varaussiirtorekisisterit (Charge-transfer devices in English)," Tampere University of Technology, Electronics Laboratory, Research Report No. 38, 1979, 20 pages.

[4] T. Saramäki and Y. Neuvo, "Analytic magnitude squared IIR filter design," Tampere University of Technology, Electronics Laboratory, Research Report No. 44, 1979, 32 pages.

[5] P. Heinonen, T. Saramäki, J. Malmivuo, and Y. Neuvo, "Periodic interference rejection using coherent sampling and waveform estimation," Tampere University of Technology, Electronics Laboratory, Research Report No. 9, 1981, 32 pages.

[6] H. Skogsrud, T. Saramäki, and Y. Neuvo, "Signal processor implementation of modem filters," Televerkets Forskninginstitutt (TF), Norway, Report No. 2/83, January 1983.

[7] K.-P. Estola, T. Saramäki, and M. Malmivuo, "Computationally efficient FIR filters for preprocessing electrocardiogram," Tampere University of Technology, Electronics Laboratory, Research Report No. 2, 1983, 15 pages.

[8] T. Saramäki, "A new class of nonrecursive digital filters for multirate filtering," Tampere University of Technology, Electronics Laboratory, Research Report No. 6, 1983, 42 pages.

OTHER PUBLICATIONS

[1] T. Saramäki, Description of the following program packages developed by the author: GROAN (p. 25), CLASSIC (p. 27), IIR (p. 28), IFIR (p. 29), NY (p. 30), SUBBI (p. 31), MULTI (p. 32), in Scandinavian digital signal processing inventory, edited by J. Skyttä, Laboratory of Information and Computer Science, Department of Technical Physics, Helsinki University of Technology, Report TKK-F-B91.

LECTURE NOTES

[1] T. Saramäki, P. Jarske, and M. Renfors, "Exercises in digital filtering," 1991 (in Finnish). See http://www.cs.tut.fi/~ts/

[2] T. Saramäki, "Basic Digital Signal Processing," 1991 (in English).

[3] T. Saramäki, "Advanced Digital Filtering," 1991 (in English).

[4] T. Saramäki, "System Level DSP Algorithms," 1997 (in English). See http://www.cs.tut.fi/~ts/

[5] T. Saramäki, "Discrete-Time Wavelets," 1997 (in English).

[6] T. Saramäki, "Digital Linear Filtering I," 1999 (in English). See http://www.cs.tut.fi/~ts/

[7] T. Saramäki, "Digital Linear Filtering II," 1999 (in English). See http://www.cs.tut.fi/~ts/

[8] T. Saramäki, "Multirate Digital Signal Processing," 1999 (in English). See http://www.cs.tut.fi/~ts/

INVITED PRESENTATIONS AND PARTICIPATION IN EDUCATION PROGRAMS

T. Saramäki, An invited talk entitled "Computationally Efficient Narrowband Linear-Phase FIR Filters," University of California, Santa Barbara, April 1982.

T. Saramäki, An invited talk entitled "Efficient Algorithms for Designing IIR filters with Arbitrary Specifications, Optimum magnitude in the Chebyshev Sense, and Different Numerator and Denominator Orders," University of California, Santa Barbara, June 1982.

T. Saramäki, An invited talk entitled "Design of Computationally Efficient Decimation and Interpolation Filters – A tutorial review," University of California, Santa Barbara, July 1986.

T. Saramäki, An invited talk entitled "Digital Signal Processing in Europe," Beijing University of Post and Telecommunication, China, November 1987.

T. Saramäki, An invited talk entitled "A New Class of Window Functions for Designing FIR Filters," University of California, Santa Barbara, June 1990.

T. Saramäki, An invited talk entitled "Multiplier-Free Decimators for Super-resolution Sigma Delta A/D Converters," University of California, Santa Barbara, June 1990.

T. Saramäki, An invited talk entitled "VLSI-Realizable Decimators," at *NORSIG Seminar in Signal Processing*, Bergen, Norway, November 1991.

T. Saramäki, An invited talk entitled "FIR Filters – Why I Am Still Engaged?" at *NORSIG Seminar in Signal Processing*, Bergen, Norway, November 1991.

T. Saramäki, An invited talk entitled "FIR Filters – Why I Am Still Engaged?" University of Victoria, Victoria, Canada, May 1992.

T. Saramäki, An invited talk entitled "Optimization of Digital Filter Structures for VLSI Implementation," Beijing University of Post and Telecommunication, China, November 1993.

T. Saramäki and A. Fam, An invited tutorial paper entitled "Subfilter Approach for Designing Efficient FIR Filters," at *the 1988 IEEE International Symposium on Circuits and Systems*, Espoo, Finland, June 1988, pp. 2903–2915.

T. Saramäki, T. Karema, T. Ritoniemi, J. Isoaho, H. Tenhunen, An invited paper entitled "VLSI-Realizable Multiplier-Free Interpolators for Sigma-Delta D/A-Converters," at *the International Conference on Circuits and Systems,* Nanjing, China, July 1989, pp. 60–63.

T. Saramäki, An invited tutorial paper entitled "Adjustable Windows for the Design of FIR Filters – A tutorial," at *the 6th Mediterranean Electrotechnical Conference*, Ljubljana, Yugoslavia, May 1991, pp. 28–33.

T. Saramäki and T. Ritoniemi, An invited paper entitled "Optimization of Digital Filter Structures for VLSI implementation," at *the 38th International Annual Conference, KoREMA*, Zagreb, Croatia, April 1993, pp. 521–526.

T. Saramäki, An education talk in Biomedical Signal Processing, Pre-Conference Tutorial Courses being entitled "Basic Digital Signal Processing," at *the First International Conference on Bioelectromagnetism*, Tampere, Finland, June 1996.

T. Saramäki, A plenary talk entitled "Efficient DSP Algorithms and their Optimization for VLSI and Signal Processor Implementations," at *the 1997 International Conference on Computer Science and Information Technologies*, Yerevan, Armenia, September 1997.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and their Optimization for VLSI and Signal Processor Implementations" Department of Telecommunications, Norwegian University of Science and Technology, May 1998.

T. Saramäki and M. Renfors, An invited paper entitled "*N*th Band Filter Design," at *the IX European Signal Processing Conference*, Island of Rhodes, Greece, September 1998, pp. pp. 1943–1947.

T. Saramäki and J. Vesma, A plenary talk entitled "Polynomial-Based Interpolation for Digital Signal Processing and Telecommunications Applications," a

plenary talk at *the 1999 International Conference on Computer Science and Information Technologies*, Yerevan, Armenia, August 1999.

T. Saramäki, "Apuneuvona luova hulluus" ("Creative madness as a basic tool") in an education program for youngsters searching for a proper profession in the future. Altogether four Finnish scientists were involved in this program that was delivered as a CDROM to most Finnish schools and was entitled "Ammattina tutkija – Ammateista haastavin" ("A researcher as a profession – the most challenging profession"), the Academy of Finland, 2000.

T. Saramäki, Invited three-hour lectures entitled "Efficient DSP Algorithms and their Optimization for Practical Applications as well as for VLSI and Signal Processor Implementations," at *the First IEEE South-American Workshop on Circuits and Systems (SAWCAS'2000)* in both in Rio de Janeiro, Brazil, November 20–22, 2000 and in Bahia Blanca, Argentina, November 22–24, 2000; T. Saramäki and J. Yli-Kaakinen, "Design of Digital Filters and Filter Banks by Optimization: Applications", a 32 pages long two-column article was included in the CD-ROM. [Online.] Available: http://www.cs.tut.fi/~ts/sldsp_part6_article.pdf

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and their Optimization for VLSI and Signal Processor Implementations," the National University of Singapore, Singapore, October 2001.

T. Saramäki, An invited talk entitled "Optimization of Digital Filters and Filter Banks: Practical Applications," the National University of Singapore, Singapore, October 2001.

T. Saramäki, An invited talk entitled "Polynomial-Based Interpolation for Digital Signal Processing Applications – A Tutorial Review," the National University of Singapore, October 2001.

T. Saramäki, Invited three-hour lectures entitled "Polynomial-Based Interpolation for Digital Signal Processing and Telecommunications Application – A Tutorial Review," at the *Second IEEE South-American Workshop on Circuits and Systems (SAWCAS'2001)* both in Rio de Janeiro, Brazil, November 25–27, 2001and in Buenos Aires, Argentina, November 27–29, 2001.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," Technical University of Sofia, Bulgaria, June 17, 2002, **under the IEEE Distinguished Lecturer Program.**

T. Saramäki, A plenary talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," at *the International Conference on Computer Systems and Technologies (e-Learning) - CompSysTech'2002)*, Sofia, Bulgaria, June 20–21, 2002, **under the IEEE Distinguished Lecturer Program.**

T. Saramäki, A humorous banquet talk consisting of two parts entitled "Digital Signal Processing from Theory to Practice" and "Recent Advances in Ant Research" at *the 5th Nordic Signal Processing Symposium*, on board Hurtigruten, Norway, October 2002.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," University of Nis, Serbia, November 25, 2002 **under the IEEE Distinguished Lecturer Program.**

T. Saramäki, A plenary talk entitled "Polynomial-Based Interpolation for Signal Processing and Telecommunication Applications," at *the X Telecommunications Forum (TELFOR 2002)*, Belgrade, Serbia November 26–28, 2002, **under the IEEE Distinguished Lecturer Program.**

T. Saramäki, An invited talk entitled "Design of Digital Filters and Filter Banks by Optimizations: Applications," at *the X Telecommunications Forum (TELFOR 2002)*, Belgrade, Serbia November 26–28, 2002, **under the IEEE Distinguished Lecturer Program.**

T. Saramäki, A TV interview on the education and research at the Department of Signal Processing, Tampere University during the above-mentioned conference. Some parts of this interview were broadcasted as a TV program in Serbia.

T. Saramäki, A plenary talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations", a plenary talk at *the 5th International Conference and Exhibition on Digital Signal Processing and Its Applications*, Moscow, Russia March 12–14, 2003.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," University of Victoria, Victoria, Canada, May 2004.

T. Saramäki, "Optimization of Digital Filters and Filter Banks: Practical Applications," University of Victoria, Victoria, Canada, May 2004.

T. Saramäki, A tutorial talk entitled "Polynomial-Based Interpolation for Digital Signal Processing and Telecommunications Applications" at *the 6th Nordic Signal Processing Symposium (NORSIG 2004)*, Espoo, Finland, June 9–11, 2004.

T. Saramäki, A plenary talk entitled "Design of Digital Filters and Filter Banks by Optimization: Applications," at *the 7th International Conference and Exhibition on Digital Signal Processing and Its Applications*, Moscow, Russia, March 16–18, 2005.

T. Saramäki, An invited talk entitled "Efficient Techniques for Image Re-Sampling," Nanyang Technological University, Singapore, July 18, 2005.

T. Saramäki, An invited talk entitled "Efficient Techniques for Image Re-Sampling," INAOE, Puebla, Mexico, March 3, 2006.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," University of Zagreb, Croatia, September 19, 2005.

T. Saramäki, An invited talk entitled "Optimization of Digital Filters and Filter Banks: Applications," University of Zagreb, Croatia, September 19, 2005.

T. Saramäki, A plenary talk entitled "Efficient Techniques for Image Re-Sampling," at *EUROCON 2005 - The International Conference on "Computer as a Tool"*, Belgrade, Serbia and Montenegro, November 21-24, 2005.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," INAOE, Puebla, Mexico, February 28, 2006.

T. Saramäki, An invited talk entitled "Optimization of Digital Filters and Filter Banks: Applications," INAOE, Puebla, Mexico, February 28, 2006.

T. Saramäki, An invited talk entitled "Efficient Techniques for Image Re-Sampling," INAOE, Puebla, Mexico, March 3, 2006.

T. Saramäki, A plenary talk entitled "Efficient Techniques for Image Re-Sampling," at *the 8th International Conference and Exhibition on Digital Signal Processing and Its Applications*, Moscow, Russia, March 29–31, 2006.

A. Gotchev and T. Saramäki, A tutorial talk entitled "Efficient Techniques for Image Re-Sampling," at *the 7th Nordic Signal Processing Symposium (NORSIG 2006)*, June 7-9, 2006, Reykjavik, Iceland, June 7–9, 2006.

T. Saramäki, An invited talk entitled "Efficient Techniques for Image Re-Sampling," Nanyang Technological University, Singapore, December 8, 2006.

T. Saramäki, An invited talk entitled "Efficient DSP Algorithms and Their Optimization for VLSI and Signal Processor Implementations," Norwegian University of Science and Technology, July 2, 2007.

T. Saramäki, An invited talk entitled "Efficient Techniques for Image Re-Sampling," Norwegian University of Science and Technology, July 2, 2007.

T. Saramäki, A plenary talk entitled "Synthesis of Computationally Efficient Linear-Phase Finite-Impulse Response Digital Filters – A Tutorial Review," at *the 9th International Conference and Exhibition on Digital Signal Processing and Its Applications*, Moscow, Russia, March 29–31, 2008.