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## WYKAZ PUBLIKACJI NAUKOWO-TECHNICZNYCH (metrologia i systemy pomiarowe – teoria pomiaru, przetwarzanie danych pomiarowych)

STRUKTURA PUBLIKACJI		po habilitacji	po doktoracie (przed habilitacją)
artykuły w czasopismach	z listy filadelfijskiej	54	2
	spoza listy filadelfijskiej	4	5
referaty w materiałach konferencji naukowych	krajowych	5	5
	międzynarodowych	84	15
książki i rozdziały w książkach	w języku polskim	6	4
	w języku obcym	4	1
patenty	krajowe	0	2
	zagraniczne	15	0
		<b>172</b>	<b>33</b>

### A. Prace opublikowane po habilitacji

#### 1. Artykuły w czasopismach naukowych

- 1.1. R. Z. MORAWSKI: "Editorial", *Measurement* (Special Section devoted to the memory of Ludwik Finkelstein), 2013, Vol. 46, No 8, pp. 2886–2889.
- 1.2. R. Z. MORAWSKI: "An application-oriented mathematical meta-model of measurement", *Measurement*, 2013, Vol. 46, pp. 3753–3765.
- 1.3. R. Z. MORAWSKI: "Measurement data processing in spectrophotometric analysers of food" (Review Paper), *Metrology and Measurement Systems*, Vol. XIX, No. 4, 2012, pp. 623–652.
- 1.4. P. L. Makowski, R. Z. MORAWSKI, Ł. Michalik and A. W. Domański: "An efficient algorithm for processing data from a multi-point sensor of vibrations", *Measurement*, 2011, Vol. 44, pp. 2060–2067.
- 1.5. A. Miękina, R. Z. MORAWSKI: "Mathematical modelling of NIR spectral data and wavelength selection for determination of olive oil mixtures", *Journal of Physics: Conf. Series*, Vol. 238, No. 1, 2010, doi:10.1088/1742-6596/238/1/012017.
- 1.6. R. Z. MORAWSKI, P. L. Makowski, Ł. Michalik and A. W. Domański: "Modelling and processing of data from a fibre-optic sensor of vibrations", *Journal of Physics: Conf. Series*, Vol. 238, No. 1, 2010, doi: 10.1088/1742-6596/238/1/012022.
- 1.7. R. Z. MORAWSKI and A. Miękina: "Improving Absorbance Spectrum Reconstruction via Spectral Data Decomposition and Pseudo-Baseline Optimization", *IEEE Transactions on Instrumentation and Measurement*, 2009, Vol. 58, No. 3, pp. 691–697.
- 1.8. A. Latała and R. Z. MORAWSKI: "Comparison of LS-type methods for determination of olive oil mixtures on the basis of NIR spectral data", *Metrology and Measurement Systems*, Vol. XV, No. 4, 2008, pp. 409–420.
- 1.9. R. Z. MORAWSKI and C. Niedziński: "Application of a Bayesian estimator for identification of edible oils on the basis of spectrophotometric data", *Metrology and Measurement Systems*, Vol. XV, No. 3, 2008, pp. 247–266.
- 1.10. R. Z. MORAWSKI: "Wino, oliwa, ... i spektrometria". *Diagnostyka* (magazyn specjalistyczny dla lekarzy wydawany przez Bayer Schering Pharma, ISSN 1898-3197), Nr 1(2), 2008, pp. 32–36.

- 1.11. R. Z. MORAWSKI: "Wino, oliwa, ... i spektrometria". *Zdrowie Kobiety* (magazyn specjalistyczny dla lekarzy wydawany przez Bayer Schering Pharma, ISSN 1898-2204), Nr 2, 2008, str. 28–34.
- 1.12. L. Mari, and R. Z. MORAWSKI: "Guest editorial – The evolving science of measurement", *Metrology and Measurement Systems*, Vol. 14, No. 1, 2007, pp. 3–7.
- 1.13. R. Z. MORAWSKI: "Spectrophotometric Applications of Digital Signal Processing", *Measurement Science and Technology*, Vol. 17, August 2006, pp. R117–R144.
- 1.14. R. Z. MORAWSKI, A. Miękina, and A. Barwicz: "Curve-Fitting Algorithms vs. Neural Networks when Applied for Estimation of Wavelength and Power in DWDM Systems", *IEEE Transactions on Instrumentation and Measurement*, Vol. 54, No. 5, October 2005, pp. 2027–2032.
- 1.15. L. Finkelstein, R. Z. MORAWSKI, and L. Mari: "Logical and Philosophical Aspects of Measurement", *Measurement – Journal of IMEKO*, Vol. 38, No. 4, December 2005, pp. 257–258.
- 1.16. C. Niedziński, R. Z. MORAWSKI: "Estimation of Low Concentrations in the Presence of High Concentrations Using Bayesian Algorithms for Interpretation of Spectrophotometric Data", *Journal of Chemometrics*, Vol. 18, No. 5, 2004, pp. 217–230.
- 1.17. R. Z. MORAWSKI: "Digital Signal Processing in Measurement Microsystems", *IEEE Instrumentation and Measurement Magazine*, Vol. 7, No. 2, June 2004, pp. 43–50.
- 1.18. R. Z. MORAWSKI, A. Miękina, T. Oleszczak, and A. Barwicz: "Polarization-versed Calibration of Spectrophotometric Transducers", *IEEE Transactions on Instrumentation and Measurement*, Vol. 52, No. 4, August 2003, pp. 1308–1313.
- 1.19. M. P. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "An Adaptive Rational Filter for Interpretation of Spectrometric Data", *IEEE Transactions on Instrumentation and Measurement*, Vol. 52, No. 3, June 2003, pp. 966–972.
- 1.20. L. Finkelstein, R. Z. MORAWSKI: "Fundamental Concepts of Measurement", *Measurement – Journal of IMEKO*, Vol. 34, No. 1, July 2003, pp. 1–2.
- 1.21. A. Iraqi, A. Barwicz, P. Mermelstein, R. Z. MORAWSKI, and W. Bock: "Design of a Wireless Communications Module for Telemetry in Civil Infrastructure Monitoring", *IEEE Transactions on Instrumentation and Measurement*, Vol. 52, No. 3, June 2003, pp. 973–977.
- 1.22. C. Niedziński, A. Miękina, R. Z. MORAWSKI: "Algorithms for Estimation of Concentrations in Spectrophotometric Analysis of Multicomponent Substances", *IEEE Transactions on Instrumentation and Measurement*, Vol. 51, No. 5, October 2002, pp. 1068–1072.
- 1.23. P. Sprzęczak, R. Z. MORAWSKI: "Cauchy Filters versus Neural Networks when Applied for Reconstruction of Absorption Spectra", *IEEE Transactions on Instrumentation and Measurement*, Vol. 51, No. 4, August 2002, pp. 815–818.
- 1.24. P. Sprzęczak, R. Z. MORAWSKI: "Cauchy-filter-based Algorithms for Reconstruction of Absorption Spectra", *IEEE Transactions on Instrumentation and Measurement*, Vol. 50, No. 5, October 2001, pp. 1123–1126.
- 1.25. T. Szafranski, R. Z. MORAWSKI: "Efficient Estimation of Uncertainty in Weakly Non-linear Algorithms for Measurand Reconstruction", *Measurement – Journal of IMEKO*, January 2001, Vol. 29, No. 1, pp. 77–85.
- 1.26. M Ben Slima, L. Szczeciński, D. Massicotte, R. Z. MORAWSKI, A. Barwicz: "Algorithmic Specification of a Specialized Processor for Spectrometric Applications", *IEEE Transactions on Instrumentation and Measurement*, Vol. 49, No. 6, December 2000, pp. 1224–1230.
- 1.27. C. Niedziński, R. Z. MORAWSKI: "Bayesian Approach to Spectrophotometric Analysis of Multicomponent Substances", *IEEE Transactions on Instrumentation and Measurement*, Vol. 49, No. 3, June 2000, pp. 637–642.
- 1.28. P. Sprzęczak, R. Z. MORAWSKI: "Calibration of a Spectrometer Using a Genetic Algorithm", *IEEE Transactions on Instrumentation and Measurement*, Vol. 49, No. 2, April 2000, pp. 449–454.

- 1.29. M. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Using Rational Filters for Digital Correction of a Spectrometric Microtransducer", *IEEE Transactions on Instrumentation and Measurement*, Vol. 49, No. 1, February 2000, pp. 43–48.
- 1.30. A. Iraqi, R. Z. MORAWSKI, A. Barwicz, W. J. Bock: "Distributed Data Processing in a Telemetric System for Monitoring Civil Engineering Structures", *IEEE Transactions on Instrumentation and Measurement*, June 1999, Vol. 48, No. 3, pp. 773–777.
- 1.31. M. Ben Slima, R. Z. MORAWSKI, A. W. Kraszewski, A. Barwicz, S. O. Nelson: "Calibration of a Microwave System for Measuring Grain Moisture Content", *IEEE Transactions on Instrumentation and Measurement*, June 1999, Vol. 48, No. 3, pp. 778–783.
- 1.32. M. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Modeling a Micro-spectrometer for Numerical Correction of its Metrological Parameters", *IEEE Transactions on Instrumentation and Measurement*, June 1999, Vol. 48, No. 3, pp. 747–752.
- 1.33. R. Z. MORAWSKI: "Zadania quasi-dynamicznego odtwarzania mezurandów", *Metrologia i Systemy Pomiarowe*, 1999, tom VI, zeszyt 4, str. 297–308.
- 1.34. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Numerical Correction of Spectrometric Data Using a Rational Filter", *Journal of Chemometrics*, Vol. 12, issue 6, 1998, pp. 379–395.
- 1.35. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz, "Variational Algorithms for Spectrogram Correction Based on Entropy-like Criteria", *Journal of Chemometrics*, Vol. 12, issue 6, 1998, pp. 397–403.
- 1.36. D. Massicotte, R. Z. MORAWSKI, A. Barwicz: "Kalman-filter-based Algorithms of Spectrophotometric Data Correction – Part I: An Iterative Algorithm of Deconvolution", *IEEE Transactions on Instrumentation and Measurement*, June 1997, Vol. 46, No. 3, pp. 678–684
- 1.37. M Ben Slima, R. Z. MORAWSKI, A. Barwicz: "Kalman-filter-based Algorithms of Spectrophotometric Data Correction – Part II: Use of Splines for Approximation of Spectra", *IEEE Transactions on Instrumentation and Measurement*, June 1997, Vol. 46, No. 3, pp. 685–689.
- 1.38. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "A Cubic FIR-type Filter for Numerical Correction of Spectrometric Data". *IEEE Transactions on Instrumentation and Measurement*, August 1997, Vol. 46, No. 4, pp. 922–928.
- 1.39. A. Miękina, R. Z. MORAWSKI, A. Barwicz: "The Use of Deconvolution and Iterative Optimization for Spectrogram Interpretation". *IEEE Transactions on Instrumentation and Measurement*, August 1997, Vol. 46, No. 4, pp. 1049–1053.
- 1.40. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Numerical Correction of Spectrometric Data Using a Bilinear Operator of Measurand Reconstruction". *Instrumentation Science & Technology*, 1997, Vol. 25, No. 3, pp. 197–205.
- 1.41. Shi Huang, R. Z. MORAWSKI, A. Barwicz: "Static Calibration of Transducers Using Gauss-function-based Approximation", *IEEE Transactions on Instrumentation and Measurement*, June 1996, Vol. 45, No.3, pp. 389–393.
- 1.42. R. Z. MORAWSKI, A. Miękina, A. Barwicz: "Combined Use of Tikhonov Deconvolution and Curve Fitting for Spectrogram Interpretation", *Instrumentation Science & Technology*, August 1996, Vol. 24, No 3, pp.155–167.
- 1.43. R. Z. MORAWSKI, L. Szczeciński, A. Barwicz: "Deconvolution Algorithms for Instrumental Applications: A Comparative Study", *Journal of Chemometrics*, Vol. 9, 1995, pp. 3–20.
- 1.44. D. Massicotte, R. Z. MORAWSKI, A. Barwicz.: "Incorporation of a Positivity Constraint into a Kalman-filter-based Algorithm for Correction of Spectrometric Data", *IEEE Transactions on Instrumentation and Measurement*, Feb. 1995, Vol. 44, No.1, pp. 2–7.
- 1.45. Shi Huang, R. Z. MORAWSKI, A. Barwicz, W. J. Bock, W. Urbańczyk: "Calibration of an Electronically-scanned White-light Interferometric Transducer for High-pressure Measurement", *IEEE Transactions on Instrumentation and Measurement*, June 1995, Vol. 44, No. 2, pp. 698–703.

- 1.46. A. Barwicz, D. Massicotte, Y. Savaria, P. A. Pango, R. Z. MORAWSKI: "An Application-specific Processor Dedicated to Kalman-filter-based Correction of Spectrometric Data", *IEEE Transactions on Instrumentation and Measurement*, June 1995, Vol.44, No. 2, pp. 720–724.
- 1.47. R. Z. MORAWSKI: "Modelowanie matematyczne a pomiar", *Metrologia i Systemy Pomiarowe*. Tom II, zeszyt 1, 1995, pp. 25–35.
- 1.48. R. Z. MORAWSKI: "Unified Approach to Measurand Reconstruction". *IEEE Transactions on Instrumentation and Measurement*, April 1994, Vol. 43, No 2, pp. 226–231.
- 1.49. A. Barwicz, D. Massicotte, Y. Savaria, R. Z. MORAWSKI: "An Integrated Structure for Kalman-filter-based Algorithms for Spectrophotometric Data Correction", *IEEE Transactions on Instrumentation and Measurement*, June 1994, Vol. 43, No 3, pp. 403–410.
- 1.50. Miękina , R. Z. MORAWSKI, A. Podgórski: "Dynamic Reconstruction of Measurands and Calibration of Measuring System", *Measurement – Journal of IMEKO*, September 1994, Vol. 14, No. 1, pp. 63–72.
- 1.51. R. Z. MORAWSKI., M. Ben Slima, M. Milewski, A. Barwicz: "Application of a Digital Signal Processor for Correction of Spectrophotometric Measurements", *IEEE Transactions on Instrumentation and Measurement*, June 1993, Vol. 43, No. 3, pp. 778–782.
- 1.52. A. Barwicz, R. Z. MORAWSKI, L. Lemire, W. J. Bock: "Calibration of an Electronic Multisensor System for Measuring High Pressures", *IEEE Transactions on Instrumentation and Measurement*, April 1992, Vol. 41, No. 2, pp. 269–273.
- 1.53. M. Ben Slima, R. Z. MORAWSKI, A. Barwicz: "Spline-Based Variational Method with Constraints for Spectrophotometric Data Correction", *IEEE Transactions on Instrumentation and Measurement*, Dec. 1992, Vol. 41, No. 6, pp. 786–789.
- 1.54. R. Z. MORAWSKI, A. Podgórski, K. Sutkowski: "Dynamic Calibration of Measurement Channels Using Algorithms of Non-differentiable Optimization", *IEEE Transactions on Instrumentation and Measurement*, Dec. 1992, Vol. 41, No. 6, pp. 881–884.
- 1.55. R. Z. MORAWSKI: "Unified Approach to Measurement Signal Reconstruction", *Measurement – Journal of IMEKO*, July–September 1991, Vol. 9, No. 3, pp. 140–144.
- 1.56. A. Barwicz, D. Bellemare, R. Z. MORAWSKI: "Digital Correction of A/D Conversion Error Due to Multiplexing Delay", *IEEE Transactions on Instrumentation and Measurement*, Feb. 1990, Vol. 39, No. 1, pp. 76–79.
- 1.57. Miękina, R. Z. MORAWSKI: "Regularized Differentiation of Measurement Data Using A-priori Information on Signal and Noise Spectra", *IEEE Transactions on Instrumentation and Measurement*, December 1990, Vol. 39, No. 6, pp. 824–826.
- 1.58. Barwicz, R. Z. MORAWSKI, J.-L. Dion: "Calibration of an Electronic Measuring System for Ultrasonic Analysis of Solutions", *IEEE Transactions on Instrumentation and Measurement*, December 1990, Vol. 39, No. 6, pp. 1030–1033.

## **2. Referaty w materiałach konferencyjnych**

- 2.1. R. Z. MORAWSKI, A. Miękina: "PCA-based algorithm for calibration of spectrophotometric analysers of food", *Journal of Physics: Conference Series*, Vol. 459, 2013, #012029, <http://iopscience.iop.org/1742-6596/459/1>.
- 2.2. R. Z. Morawski, A. Miękina: "A comparative study of forty algorithms for spectrophotometric analysis of edible oil mixtures", *Proc. XXth IMEKO World Congress 'Metrology for Green Growth' (Busan, Republic of Korea, September 9–14, 2012)*, 6 pages.
- 2.3. R. Z. MORAWSKI, A. Miękina, "A method of weighing matrix for spectrophotometric analysis of oil mixtures" (extended abstract), *Proc. Conf. on Advanced Mathematical and Computational Tools in Metrology and Testing – AMCTM 2011 (Göteborg, Sweden, June 20–22, 2011)*, 2 pages.

- 2.4. R. Z. MORAWSKI, "Application-oriented approach to mathematical modelling of measurement processes", *Proc. Joint International IMEKO TC1+ TC7+ TC13 Symposium (Jena, Germany August 31 – September 2, 2011)*, 11 pages.
- 2.5. A. Miękina, R. Z. MORAWSKI: "A calibration method, based on piecewise ridge LS estimator, designed for determination of olive oil mixtures on the basis of NIR spectral data", *Proc. XIX IMEKO World Congress (Lisbon, Portugal, September 6–11, 2009)*, pp. 2559–2563.
- 2.6. A. Miękina, R. Z. MORAWSKI: "A flexible experimental set-up for development of spectrophotometric analysers of food", *Proc. XIX IMEKO World Congress (Lisbon, Portugal, September 6–11, 2009)*, pp. 2569–2573.
- 2.7. A. Latała and R. Z. MORAWSKI: "A comparative study of nine methods of estimation when applied for determination of olive oil mixtures on the basis of NIR spectrophotometric data", *Proc. IMEKO TC19-TC23-TC24 Int. Conf. on Metrology of Environmental, Food and Nutritional Measurements (Budapest, Hungary, September 10–12, 2008)*, CD-ROM.
- 2.8. R. Z. MORAWSKI: "On food, spectrophotometry, and measurement data processing" (keynote lecture), *Proc. IMEKO TC1 & TC7 Joint Symposium on Man Science and Measurement (Annecy, France, September, 3–5, 2008)*, pp. 7–20.
- 2.9. A. Miękina, and R. Z. MORAWSKI: "An Improved Criterion for Inverse-Model-Based Calibration of Spectrophotometric Transducers", *Proc. IEEE Instrumentation and Measurement Technology Conf.–IMTC 2007 (Warsaw, Poland, May 1–3, 2007)*, paper #7667, CD-ROM.
- 2.10. A. Miękina, and R. Z. MORAWSKI: "Global-optimization approach of spectrum reconstruction", *Proc. XVIII IMEKO World Congress (Rio de Janeiro, Brazil, September 17–22, 2006)*, CD-ROM.
- 2.11. W. Barwicz, A. Podgórski, S. Duminov, and R. Z. MORAWSKI: "New principle of acoustic calibrators design", *Proc. XVIII IMEKO World Congress (Rio de Janeiro, Brazil, September 17–22, 2006)*, CD-ROM.
- 2.12. R. Z. MORAWSKI, and A. Miękina: "Signal Decomposition and Pseudo-baseline Optimization in Spectrum Reconstruction", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC 2006 (Sorrento, Italy, April 24–27, 2006)*, pp. 1134–1138.
- 2.13. R. Z. MORAWSKI, and A. Miękina: "Monitoring of the OSNR in DWDM Systems Using a Low-resolution Spectrometric Transducer", *Proc. Instrum. & Meas. Technol. Conf. – IMTC 2005 (Ottawa, Canada, May 17–19, 2005)*, pp. 2306–2309.
- 2.14. R. Z. MORAWSKI: "Introduction to the panel discussion 1: Scope of Measurement Science vs. scope and aims of TC7 activities", *Proc. 10th IMEKO-TC7 Int. Symposium (Saint-Petersburg, Russia, June 30–July 2, 2004)*, pp. VII–VIII.
- 2.15. R. Z. MORAWSKI: "Realists' vs. Instrumentalists' Understanding of Measurement", *Proc. XVIIth IMEKO World Congress (Cavtat–Dubrovnik, Croatia, June 22–27, 2003)*, CD-ROM.
- 2.16. R. Z. MORAWSKI, A. Miękina, M. Wiśniewski, A. Barwicz: "Neural-Network-Based Calibration of a Mini-spectrophotometer", *Proc. IEEE Instrumentation and Measurement Technology Conf.– IMTC 2002 (Anchorage, Alaska, USA, May 21–23, 2002)*, pp. 1083–1086.
- 2.17. R. Z. MORAWSKI: "Cyfrowe przetwarzanie sygnałów w systemach pomiarowych", *Mat. Krajowego Kongresu Metrologii – KKM 2001 (Warszawa, 24–27 czerwca 2001 r.)*, tom 1 – pp. 9–24 (referat zaproszony).
- 2.18. M. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Calibration of a Mini-spectrophotometer Using a Neural-network-based Interpolator", *Proc. IEEE Instrumentation and Measurement Technology Conf.–IMTC 2001 (Budapest, Hungary, May 21–23, 2001)*, pp. 111–115.
- 2.19. P. Sprzęczak, R. Z. MORAWSKI: "Cauchy Filters versus Neural Networks when Applied for Reconstruction of Absorption Spectra", *Proc. IEEE Instrumentation and Measurement Technology Conf.–IMTC 2001 (Budapest, Hungary, May 21–23, 2001)*, pp. 1371–1374.

- 2.20. T. Szafranski, P. Spręczak, R. Z. MORAWSKI: "An Algorithm for Spectrometric Data Correction with Built-in Estimation of Uncertainty", *Proc. XVIth IMEKO World Congress (Vienna, Austria, September 25–28, 2000)*, CD-ROM.
- 2.21. A. Miękina, R. Z. MORAWSKI, N. Obarski: "Computer-aided Analysis of Multicomponent Substances Using a Mini-Spectrophotometer", *Proc. XVIth IMEKO World Congress (Vienna, Austria, September 25–28, 2000)*, CD-ROM.
- 2.22. C. Niedziński, A. Miękina, R. Z. MORAWSKI: "Algorithms for Estimation of Concentrations in Spectrophotometric Analysis of Multicomponent Substances", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC 2000 (Baltimore, USA, May 1–4, 2000)*, pp. 703–706.
- 2.23. M. P. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Algorithms for Interpretation of Spectrometric Data – A Comparative Study", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC 2000 (Baltimore, USA, May 1–4, 2000)*, pp. 707–709.
- 2.24. M. P. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "The Effect of the Quality of Spectrometric Data on the Result of Their Interpretation", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC 2000 (Baltimore, USA, May 1–4, 2000)*, pp. 951–954.
- 2.25. P. Spręczak, R. Z. MORAWSKI: "Cauchy-filter-based Algorithms for Reconstruction of Spectra", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC 2000 (Baltimore, USA, May 1–4, 2000)*, pp. 965–969.
- 2.26. A. Miękina, R. Z. MORAWSKI: "An Alternative Approach to Interpretation of Spectrometric Data", *Proc. Int. Conf. – MEASUREMENT '99 (Smolenice, Slovakia, April 26–29, 1999)*, pp. 185–188.
- 2.27. C. Niedziński, R. Z. MORAWSKI: "Bayesian Approach to Spectrophotometric Analysis of Multicomponent Substances", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'99 (Venice, Italy, May 24–26, 1999)*, pp. 1901–1906.
- 2.28. P. Spręczak, R. Z. MORAWSKI: "Calibration of a Spectrometer Using a Genetic Algorithm", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'99 (Venice, Italy, May 24–26, 1999)*, pp. 1027–1032.
- 2.29. M. P. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "An Adaptive Rational Filter for Interpretation of Spectrometric Data", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'99 (Venice, Italy, May 24–26, 1999)*, pp. 1907–1912.
- 2.30. A. Iraqi, A. Barwicz, P. Mermelstein\*, R. Z. MORAWSKI, W. Bock: "Design of a Wireless Communications Module for Telemetry in Civil Infrastructure Monitoring", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'99 (Venice, Italy, May 24–26, 1999)*, pp. 199–203.
- 2.31. T. Szafranski, R. Z. MORAWSKI: "Dealing with Overestimation of Uncertainty in Algorithms of Mesurand Reconstruction", *Proc. XVth IMEKO World Congress (Osaka, Japan, June 13–18, 1999)*, CD-ROM.
- 2.32. R. Z. MORAWSKI: "The Role of Digital Signal Processing in Measurement Science", *Proc. Int. IMEKO-TC7 Workshop on Advances of Measurement Science (Kyoto, Japan, June 20–21, 1999)*, pp. 149–174 (invited paper).
- 2.33. R. Z. MORAWSKI: "Zadania quasi-dynamicznego odtwarzania mezurandów", *Mat. III Symp. Pomiarów Dynamicznych (Gliwice, 9–10 listopada 1999 r.)*, *Metrologia i Systemy Pomiarowe*, 1999, tom VI, zeszyt 4, str. 297–308.
- 2.34. T. Szafranski, R. Z. MORAWSKI: "Accuracy of Measurand Reconstruction – Comparison of Four Methods of Analysis", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'98 (St. Paul, USA, May 18–21, 1998)*, pp. 32–35.
- 2.35. A. Iraqi, R. Z. MORAWSKI, A. Barwicz, W. J. Bock: "Distributed Data Processing in a Telemetric System for Monitoring Civil Engineering Structures", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'98 (St. Paul, USA, May 18–21, 1998)*, pp. 186–190.

- 2.36. M Ben Slima, R. Z. MORAWSKI, A. W. Kraszewski, A. Barwicz, S. O. Nelson: "Calibration of a Microwave System for Measuring Grain Moisture Content", *Proc. IEEE Instrumentation and Measurement Technology Conf. IMTC'98 (St. Paul, USA, May 18–21, 1998)*, pp. 642–647.
- 2.37. M. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Using Rational Filters for Digital Correction of a Spectrometric Micro-transducer", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'98 (St. Paul, USA, May 18–21, 1998)*, pp. 1302–1306.
- 2.38. R. Z. MORAWSKI: "Zadania odwrotne w metrologii", *Mat. Konf. nauk.-tech. "Podstawowe problemy metrologii" (Ustroń, 5–8 maja 1998 r.)*, str. 37–49.
- 2.39. A. Miękina, R. Z. MORAWSKI: "Industrial Application of Algorithms for Interpretation of Spectrometric Data". *Proc. 6th IMEKO Symp. "Metrology for Quality Control in Production" (Vienna, Austria, September 8–10, 1998)*, pp. 441–447.
- 2.40. P. Kluk, G. Misiurski, R. Z. MORAWSKI: "Total Least Squares versus RBF Neural Networks in Static Calibration of Transducers", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'97 (Ottawa, Canada, May 19–21, 1997)*, pp. 424–427.
- 2.41. M. Wiśniewski, R. Z. MORAWSKI, A. Barwicz: "Modeling a Micro-spectrometer for Numerical Correction of its Metrological Parameters", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'97 (Ottawa, Canada, May 19–21, 1997)*, pp. 564–567.
- 2.42. M Ben Slima, L. Szczeciński, D. Massicotte, R. Z. MORAWSKI, A. Barwicz: "Algorithmic Specification of a Specialized Processor for Spectrometric Applications", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'97 (Ottawa, Canada, May 19–21, 1997)*, pp. 90–95.
- 2.43. A. Iraqi, R. Z. MORAWSKI, A. Barwicz, W. J. Bock: "Static Calibration of a Thermally Self-compensated Fiber-optic Sensor for High-pressure Measurements", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'97 (Ottawa, Canada, May 19–21, 1997)*, pp. 814–818.
- 2.44. A. Barwicz, M Ben Slima, R. E. Lebrun, R. Z. MORAWSKI: "Signal-processing Support for Analysis of Waters Contaminated by Pulp-and-paper Industry. *Proc. XIVth IMEKO World Congress (Tampere, Finland, June 1–6, 1997)*, CD-ROM.
- 2.45. R. Z. MORAWSKI, P. Sprzęczak, A. Witan: "Using a Genetic Algorithm for Interpretation of Spectrometric Data". *Mat. III Konf. Nauk.-Tech. MECHATRONIKA '97 (Warszawa, 20–22 listopada 1997 r.)*, *Prace Naukowe PW – Konferencje*, zeszyt 14, Oficyna Wydawnicza PW, Warszawa 1997, str. 834–839.
- 2.46. R. Z. MORAWSKI, C. Niedziński: "Bayesian Approach to Spectrum Reconstruction". *Mat. III Konf. Nauk.-Tech. MECHATRONIKA '97 (Warszawa, 20–22 listopada 1997 r.)*, *Prace Naukowe PW – Konferencje*, zeszyt 14, Oficyna Wydawnicza PW, Warszawa 1997, str. 840–845.
- 2.47. P. Kluk, R. Z. MORAWSKI: "Static Calibration of Sensors Using Splines and Neural Networks", *Record of 3rd European Conf. Optical Chemical Sensors and Biosensors (Zurich, Switzerland, March 31 – April 3, 1996)*, pp. 216.
- 2.48. Shi Huang, R. Z. MORAWSKI, A. Barwicz: "Static Calibration Based on Superposition of Splines in One Variable", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, June 4–6, 1996)*, pp. 49–53.
- 2.49. R. Z. MORAWSKI, A. Miękina, A. Barwicz: "The Use of Deconvolution and Iterative Optimization for Spectrogram Interpretation", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, June 4–6, 1996)*, pp. 566–569.
- 2.50. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Quadratic FIR Filter for Numerical Correction of Spectrometric Data", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, June 4–6, 1996)*, pp. 1046–1049.
- 2.51. A. Miękina, R. Z. MORAWSKI, A. Podgórski: "Using Variational Approach and Spectrometry-specific Criteria for Calibration of Spectrometric Systems". *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, June 4–6, 1996)*, pp. 58–61.

- 2.52. P. Kluk, R. Z. MORAWSKI: "Static Calibration of Transducers Using Parametrization and Neural-Network-based Approximation", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, Belgium, June 4–6, 1996)*, pp. 581–585.
- 2.53. R. Z. MORAWSKI, A. Miękina: "The Use of Deconvolution and Iterative Optimization for Spectrogram Interpretation", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'96 (Brussels, Belgium, June 4–6, 1996)*, pp. 566–569.
- 2.54. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Numerical Correction of Spectrometric Data Using a Bilinear Operator of Measurand Reconstruction", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'95 (Boston, MA, April 24–26, 1995)*, pp. 488–491.
- 2.55. Shi Huang, R. Z. MORAWSKI, A. Barwicz: "Static Calibration of Transducers Using Gauss-function-based Approximation", *Proc. IEEE Instrumentation and Measurement Technology Conf. – IMTC'95 (Boston, MA, April 24–26, 1995)*, pp. 460–464.
- 2.56. R. Z. MORAWSKI: "Splajny i neurony – udreka czy ekstaza?", *Mat XVII Międzynarodowa Konf. Metrologów – MKM '95 (Zielona Góra, 21–23 września 1995 r.)*, pp. 476–479 (referat zamówiony).
- 2.57. R. Z. MORAWSKI, P. Sokołowski: "Application of Numerical Differentiation for Measurand Reconstruction", *Proc. 7th IMEKO-TC4 Int. Symp. Modern Electrical & Magnetic Measurements (Prague, ČSSR, September 13–14, 1995)*, pp. 230–234.
- 2.58. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Spectrometric Data Correction Using Recursive Quadratic Operator of Measurand Reconstruction", *Proc. Int. Conf. on Signal Processing Applications & Technology – ICSPAT'95 (Boston, USA, Oct. 24–26, 1995)*, pp. 588–592.
- 2.59. R. Z. MORAWSKI, B. Pawiński: "Improving Resolution of Spectrometric Analysis by Means of Adjoint-operator Method and B-splines", *Proc. 6th Int. Conf. Industrial Metrology CIMI'95 (Zaragoza, Spain, Oct. 25–27, 1995)*, pp. 382–390.
- 2.60. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Variational Algorithms of Measurand Reconstruction Based on Entropy-Like Criteria", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'94 (Hamamatsu, Japan, May 10–12, 1994)*, pp. 361–363.
- 2.61. Shi Huang, R. Z. MORAWSKI, A. Barwicz, W. Bock, W. Urbańczyk: "Calibration of an Electronically Scanned White-Light Interferometric Transducer for High-Pressure Measurements", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'94 (Hamamatsu, Japan, May 10–12, 1994)*, pp. 1079–1082.
- 2.62. A. Barwicz, M. Ben Slima, D. Massicotte, R. Z. MORAWSKI, C. Thellen: "Improving Resolution of Analytical Instruments in Environmental Laboratories", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'94 (Hamamatsu, Japan, May 10–12, 1994)*, pp. 544–547.
- 2.63. Barwicz, D. Massicotte, Y. Savaria, M.-A. Santerre, R. Z. MORAWSKI: "An Application-Specific Processor Dedicated to Kalman-Filter-Based Correction of Spectrometric Data", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'94 (Hamamatsu, Japan, May 10–12, 1994)*, pp. 352–356.
- 2.64. P. Brouard, R. Z. MORAWSKI, A. Barwicz: "DSP-based Correction of Spectrograms Using Cubic Splines and Kalman Filtering", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'94 (Hamamatsu, Japan, May 10–12, 1994)*, pp. 1443–1446.
- 2.65. Barwicz, R. Z. MORAWSKI: "Design Methodology as a Basis for Expert Systems Dedicated to Measuring Systems", *Proc. 10th ISPE/IFAC Int. Conf. CAD/CAM, Robotics and Factories of the Future, CARS & FOF'94 (Ottawa, Canada, August 21–22, 1994)*, pp. 203–208.
- 2.66. Kalinowska, R. Z. MORAWSKI, T. Łubianka: "Incorporation of the Positivity Constraint into a Cepstral Method of Measurand Reconstruction", *Proc. XIIIth IMEKO World Congress (Torino, Italy, September 5–9, 1994)*, pp. 429–434.
- 2.67. L. Szczeciński, R. Z. MORAWSKI, A. Barwicz: "Original-domain Tikhonov Regularisation and Non-negativity Constraint Improve Resolution of Spectrometric Analysis", *Proc. XIIIth IMEKO World Congress (Torino, Italy, September 5–9, 1994)*, pp. 441–446.



- 2.68. R. Z. MORAWSKI, A. Podgórski, M. Wolny: "Solving the Problem of Static Calibration by Means of Splines in Two Variables", *Proc. XIIIth IMEKO World Congress (Torino, Italy, September 5–9, 1994)*, pp. 916–920.
- 2.69. R. Z. MORAWSKI, A. Podgórski: "Dynamic Calibration Using Variational Algorithms Based on Entropy-like Criteria", *Proc. XIIIth IMEKO World Congress (Torino, Italy, September 5–9, 1994)*, pp. 921–927.
- 2.70. W. Barwicz, R. Z. MORAWSKI, J. M. Mosakowski, A. Podgórski: "Portable Real-time Sound and Vibration Analyser", *Proc. XIIIth IMEKO World Congress (Torino, Italy, September 5–9, 1994)*, pp. 2191–2194.
- 2.71. A. Barwicz, D. Massicotte, Y. Savaria, M.-A. Santerre, R. Z. MORAWSKI: "An Integrated Structure for Kalman-filter-based Measurand Reconstruction – Architecture and Design", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'93 (Irvine, USA, May 18–20, 1993)*, pp. 387–390.
- 2.72. R. Z. MORAWSKI: "Unified Approach to Measurand Reconstruction". *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'93 (Irvine, USA, 18–20 May, 1993)*, pp. 403–408 (invited paper).
- 2.73. D. Massicotte, R. Z. MORAWSKI, A. Barwicz: "Efficiency of Constraining the Set of Feasible Solutions in Kalman-filter-based Algorithms of Spectrophotometric Data Correction", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'93 (Irvine, USA, May 18–20, 1993)*, pp. 496–499.
- 2.74. M. Ben Slima, R. Z. MORAWSKI, A. Barwicz: "A Recursive Spline-based Algorithm for Spectrophotometric Data Correction", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC'93 (Irvine, USA, May 18–20, 1993)*, pp. 500–503.
- 2.75. A. Miękina, R. Z. MORAWSKI, A. Podgórski: "Optimal Calibration of Dynamic Measurement Channels Using Spectral Method with Tikhonov Regularisation". *Proc. Int. IMEKO-TC4 Symp. (Brussels, Belgium, May 12–13, 1993)*, pp. 97–102.
- 2.76. R. Z. MORAWSKI, A. Podgórski, M. Urban: "Variational Algorithms of Dynamic Calibration Based on Criteria Defined in Measurand Domain". *Proc. Int. IMEKO-TC1&TC7 Coll. (London, UK, September 8–10, 1993)*, pp. 311–316.
- 2.77. M. S. Milewski, R. Z. MORAWSKI, L. Szczeciński: "Comparative Study of Some Iterative and Variational Algorithms of Measurand Reconstruction". *Proc. Int. IMEKO-TC1&TC7 Coll. (London, UK, September 8–10, 1993)*, pp. 305–310.
- 2.78. A. Miękina, R. Z. MORAWSKI: "Incorporation of the Positivity Constraint into a Tikhonov-method-based Algorithm of Measurand Reconstruction". *Proc. Int. IMEKO-TC1&TC7 Coll. (London, UK, September 8–10, 1993)*, pp. 299–304.
- 2.79. P. Brouard, R. Z. MORAWSKI, A. Barwicz: "Approximation of Spectrograms by Cubic Splines Using the Kalman Filter", *Proc. 1993 Canadian Conf. on Electrical & Computer Engineering (Vancouver, Canada, September 14–17, 1993)*, pp. 900–903.
- 2.80. R. Z. MORAWSKI, A. Podgórski: "Choosing the Criterion for Dynamic Calibration of Measuring System", *Proc. 5th IMEKO-TC4 Int. Symp. (Vienna, Austria, April 8–10, 1992)*, Part III, pp. 43–50.
- 2.81. A. Miękina, R. Z. MORAWSKI, A. Podgórski: "Logical Structure of a Software System for Computer-aided Development of Calibration and Reconstruction Algorithms", *Proc. 5th IMEKO-TC4 Int. Symp. (Vienna, Austria, April 8–10, 1992)*, Part III, pp. 84–89.
- 2.82. D. Massicotte, R. Z. MORAWSKI, A. Barwicz: "Incorporation of a Positivity Constraint into a Kalman-filter-based Algorithm for Correction of Spectrophotometric Data", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '92 (New York, USA, May 12–14, 1992)*, pp. 590–593.
- 2.83. R. Z. MORAWSKI, A. Podgórski, K. Sutkowski: "Dynamic Calibration of Measurement Channels Using Algorithms of Non-differentiable Optimization", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '92 (New York, USA, May 12–14, 1992)*, pp. 518–522.

- 2.84. M. Ben Slima, R. Z. MORAWSKI, A. Barwicz: "Spline-based LMS Method with Constraints for Spectrophotometric Data Correction", *Record of IEEE Instrum. & Meas Technol. Conf. – IMTC '92 (New York, USA, May 12–14, 1992)*, pp. 594–597.
- 2.85. A. Barwicz, R. Z. MORAWSKI, L. Lemire, W. J. Bock: "Calibration of an Electronic Multisensor System for Measuring High Pressures", *Record of IEEE Inst. & Meas. Technol. Conf. – IMTC '91 (Atlanta, USA, May 14–16, 1991)*, pp. 592–597.
- 2.86. R. Z. MORAWSKI, L. Lemire, M. Ben Slima, A. Barwicz: "The Use of Splines for Static Calibration of Electronic Measuring Systems – A Comparative Study". *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '91 (Atlanta, USA, May 14–16, 1991)*, pp. 202–208.
- 2.87. R. Z. MORAWSKI, E. Węclawek: "Measurement Signal Reconstruction Using Spline Approximation", *Proc, XIIth IMEKO World Congress (Beijing, China, September 5–10, 1991)*, Int. Academic Pub., 1991, pp. 1223–1228.
- 2.88. A. Barwicz, R. Z. MORAWSKI, J.-L. Dion: "Calibration of an Electronic Measuring System for Ultrasonic Analysis of Solutions", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '90 (San Jose, USA, Feb. 13–15, 1990)*, pp. 100–102.
- 2.89. A. Miękina, R. Z. MORAWSKI: "Regularized Differentiation of Measurement Data Using A-priori Information on Signal and Noise Spectra", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '90 (San Jose, USA, Feb. 13–15, 1990)*, pp. 159A–159D.

### **3. Książki i rozdziały w książkach**

- 3.1. R. Z. MORAWSKI, A. Miękina, J. Wagner: "A method of weighing matrix for spectrophotometric analysis of oil mixtures", [in:] *Advanced Mathematical and Computational Tools in Metrology and Testing IX* (Eds. F. Pavese, M. Bär, J.-R. Filtz, A. B. Forbes, L. Pendril, K. Shirono), World Scientific Publishing Company, Singapore-Hackensack-London 2012, pp. 276–283.
- 3.2. C. Niedziński, R. Z. MORAWSKI: "Bayesowska metoda estymacji stężeń na podstawie danych spektrofotometrycznych", [w:] *Problemy metrologii elektronicznej i fotonicznej*, Tom 3 (red. J. Mroczka), Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2010, ss. 55–106.
- 3.3. J. Krupka, A. Miękina, R. Z. MORAWSKI, L. J. Opalski: *Wstęp do metod numerycznych dla studentów elektroniki i technik informacyjnych* (wydanie II zmienione). Oficyna Wydawnicza PW, Warszawa 2009, stron 300 +CD (podręcznik akademicki).
- 3.4. R. Z. MORAWSKI: "Sensor Applications of Digital Signal Processing", [in:] *Encyclopedia of Sensors* (Eds. C. A. Grimes, E. C. Dickey, M. V. Pishko), American Scientific Publisher, 2006, Vol. 9, pp. 135–164.
- 3.5. R. Z. MORAWSKI: "The Role of Digital Signal Processing in Measurement Science". [in:] *Measurement Science – A Discussion* (Eds. K. Kariya & L. Finkelstein), Ohmsha Press Pub., Tokyo 2000, pp. 77–102.
- 3.6. J. Krupka, R. Z. MORAWSKI, L. J. Opalski: *Wstęp do metod numerycznych dla studentów elektroniki i technik informacyjnych*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999, stron 195 (podręcznik akademicki).
- 3.7. J. Krupka, R. Z. MORAWSKI, L. J. Opalski: *Metody numeryczne dla studentów elektroniki i technik informacyjnych*. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1997, stron 163 (skrypt akademicki).
- 3.8. J. Jaworski, R. Z. MORAWSKI, J. Olędzki: *Wprowadzenie do metrologii i techniki eksperymentu*, WNT, Warszawa 1992, stron 211 (podręcznik akademicki).
- 3.9. R. Z. MORAWSKI, A. Podgórski, J. Hatt: "KALN – Thermokinetics Reconstruction by Multi-body Method", *Program listing published in "Thermokinetics – Signal Processing in Calorimetric System"* (ed. W. Zielenkiewicz), Ossolineum, 1990, pp. 222–227.
- 3.10. R. Z. MORAWSKI: Specyfikacja programów opracowanych w ramach tematu I.21, w: *Katalog programów komputerowych opracowanych w Centralnym Programie Badań Podstawowych CPBP 02.20*, Ośrodek Postępu Technicznego, Katowice 1990, str. 76–105.

#### **4. Patenty**

- 4.1. A. Barwicz, R. Z. MORAWSKI, S. Lesueur, A. Miekina, T. Oleszczak, Flash Optical Performance Monitor, EU Patent Office, Patent #EP1685663, issued on October 16, 2013.
- 4.2. R. Z. Morawski, A. Barwicz, M. Ben Slima, and A. Miękina: "Method of Interpreting Spectrometric Data", Canada, Patent #2,237,944 issued on January 29, 2008.
- 4.3. A. Barwicz, R. Z. Morawski, A. Miękina, S. Lesueur, and T. Oleszczak: "Flash Optical Performance Monitor", USA, Patent #7,315,370 issued on January 1, 2008.
- 4.4. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", Canada, Patent #2,237,970 issued on December 19, 2006.
- 4.5. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", USA, Patent #7,084,974 issued on August 1, 2006.
- 4.6. A. Barwicz, R. Z. Morawski, M. Ben Slima, A. Miękina, and M. Wiśniewski: "Method for Extracting Spectral Parameters of Channels from Non-Channelised Light", USA, Patent #6,826,331 issued on November 30, 2004.
- 4.7. A. Barwicz, R. Z. Morawski, M. Ben Slima, A. Miękina, and M. Wiśniewski: "Method for Extracting Spectral Parameters of Channels from Non-Channelised Light", European Patent Office, Patent Application #02764429.3 published on November 17, 2004.
- 4.8. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", Germany, Patent #0,983,490 issued on August 7, 2002.
- 4.9. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", France, Patent #0,983,490 issued on August 7, 2002.
- 4.10. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", United Kingdom, Patent #0,983,490 issued on August 7, 2002.
- 4.11. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", Ireland, Patent #0,983,490 issued on August 7, 2002.
- 4.12. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", Netherlands, Patent #0,983,490 issued on August 7, 2002.
- 4.13. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", European Patent Office, Patent #0,983,490 issued on August 7, 2002.
- 4.14. A. Barwicz, R. Z. Morawski, and M. Ben Slima: "Apparatus and Method for Light Spectrum Measurement", USA, Patent #6,002,479 issued on December 14, 1999.
- 4.15. R. Z. Morawski, A. Barwicz, M. Ben Slima, and A. Miękina: "Method of Interpreting Spectrometric Data", USA, Patent #5,991,023 issued on November 23, 1999.

#### **B. Prace opublikowane po doktoracie, przed habilitacją**

##### **1. Artykuły w czasopismach naukowych**

- 1.1. R. Z. MORAWSKI, A. Podgórski: "Methodology of Investigation of the Algorithms for Reconstruction of Thermokinetics", *Bulletin of the Polish Academy of Sciences. – Technical Sciences*, 1983, Vol. 31, No. 1–12, pp. 65–69.
- 1.2. R. Z. MORAWSKI, A. Podgórski: "Marmet's Filter – Design Algorithm and Realization on Minicomputer MERA 303", *Prace Naukowe Politechniki Warszawskiej – Elektronika*, 1982, zeszyt 56, str. 185–194.
- 1.3. R. Z. MORAWSKI: "Numerical Determination of Marmet's Filter Parameters", *Review of Scientific Instruments*, 1982, Vol. 53, p. 540.
- 1.4. R. Z. MORAWSKI, A. Podgórski: "Modelowanie dynamiki elementów cyfrowych", *Prace Naukowe Politechniki Warszawskiej – Elektronika*, 1979, zeszyt 42, str. 7–20.

- 1.5. R. Z. MORAWSKI, A. Podgórski: "Zmodyfikowana metoda potencjałów węzłowych dla sieci z idealnymi wzmacniaczami operacyjnymi", *Prace Naukowe Politechniki Warszawskiej – Elektronika*, 1979, zeszyt 42, str. 21–34.
- 1.6. R. Z. MORAWSKI, A. Podgórski: "Badanie iteracyjnych procedur rozwiązywania równań liniowych". *Prace Naukowe Politechniki Warszawskiej – Elektronika*, 1979, zeszyt 42, str. 43–51.
- 1.7. A. Podgórski, A. Barwicz, R. Z. MORAWSKI: "Program analizy dynamiki licznika elektronicznego", *Prace Naukowe Politechniki Warszawskiej – Elektronika*, 1979, zeszyt 42, str. 59–65.

## **2. Referaty w materiałach konferencyjnych**

- 2.1. A. Barwicz, R. Z. MORAWSKI: "Requirements for Tools of Computer-aided Design of Measuring Systems", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '89 (Washington D.C., USA, April 25–27, 1989)*, pp. 150–152.
- 2.2. R. Z. MORAWSKI: "Unified Approach to Measurement Signal Reconstruction", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '89 (Washington D.C., USA, April 25–27, 1989)*, pp. 446–449.
- 2.3. A. Barwicz, D. Bellemare, R. Z. MORAWSKI: "Digital Correction of A/D Conversion Error Due to Multiplexing Delay", *Record of IEEE Instrumentation and Measurement Technology Conf. – IMTC '89 (Washington D.C., USA, April 25–27, 1989)*, pp. 204–207.
- 2.4. A. Miękina, R. Z. MORAWSKI: "Real-time Differentiation of Measurement Data Using Tichonov Regularization", *Proc. Int. Metrology Conf. EMISCON'89 (Prague, ČSSR, June 13–15, 1989)*, pp. 153–155.
- 2.5. R. Z. MORAWSKI: "Direct Methods of Measurement Signal Reconstruction", *Proc. XIth World IMEKO Congress (Houston, USA, Oct. 16–21, 1988)*, Vol. Applications, pp. 111–120.
- 2.6. M. A. Markowski, R. Z. MORAWSKI: "Odtwarzanie sygnałów pomiarowych metodą operatora sprzężonego", *Mat. XX Międzyuczelniana Konf. Metrologów – MKM '88 (Szczecin, 21–23 września 1988 r.)*, str. 51–58.
- 2.7. A. Miękina, R. Z. MORAWSKI: "Digital Correction of Instrumental Errors in Spectrophotometric Measurements", *Proc. Int. Metrology Conf. EMISCON'87 (Gottwaldov, ČSSR, April 28–30, 1987)*, Vol. 2, pp. 24–29.
- 2.8. R. Z. MORAWSKI, W. Winiecki: "An Improved Method of Static Self-correction Based on Spline Approximation", *Proc. Int. Metrology Conf. EMISCON'87 (Gottwaldov, ČSSR, April 28–30, 1987)*, Vol. 2, pp. 33–37.
- 2.9. R. Z. MORAWSKI: "On Initial-condition Problem in Measurement Signal Reconstruction", *Proc. 6th IMEKO-TC7 Int. Symp. (Budapest, Hungary June 10–12, 1987)*, pp. 47–52.
- 2.10. A. Miękina A., R. Z. MORAWSKI: "Noise Reduction in Spectrophotometric Data Processing Using Tichonov's Regularization", *Proc. 1st Int. IMEKO-TC4 Symp. Noise in Electrical Measurements (Como, Italy, June 19–22, 1986)*, pp. 217–222.
- 2.11. R. Z. MORAWSKI: "On reconstruction of Measurement Signals with Discontinuities", *Proc. 5th Int. IMEKO-TC7 Symp. Intelligent Measurements (Jena, GDR, June 10–14, 1986)*, Plenum Pub., 1987, pp. 257–260.
- 2.12. R. Z. MORAWSKI, M. Kotelba: "Pomiar Transmitancji Wspomagany Mikrokomputerem", *Mat. XVII Międzyuczelnian Konf. Metrologów MKM '85 (Zielona Góra, 10–12 września 1985 r.)*, str. 146–153.
- 2.13. R. Z. MORAWSKI, W. Winiecki: "Piecewise-homogeneous Approximation of Measurement Data Subject to Random Errors – An Algorithm and Its Application", *Proc. Xth IMEKO World Congress (Prague, April 22–26, 1985)*, *Acta IMEKO*, H-168, Vol. I, Budapest 1985, pp. 107–114.
- 2.14. R. Z. MORAWSKI, A. Podgórski: "Simple Algorithm for On-line Calorimeter Calibration", *Proc. 4th IMEKO-TC7 Int. Symp. Measurement and Estimation (Bressanone, Italy, May 8–12, 1984)*, pp. 249–253.

- 2.15. R. Z. MORAWSKI, A. Podgórski: "Zastosowanie wielomianów Grama i Legendre'a do wygładzania i różniczkowania danych pomiarowych", *Mat. XVII Międzyucz. Konf. Metrologów – MKK '84 (Poznań, 19–21 września 1984 r.)*, tom I, str. 187–195.
- 2.16. W. Zielenkiewicz, R. Z. MORAWSKI, J. Hatt, E. Margas, J. Zaslona: "Mikroprocesornaja sistema nabora i preobrazowanija kalorimetriceskogo signala", *Sbornik dopol. dokl. X Vsesoj. konf. po kalorimetrii i chim. termod. (Moskva, 12–14 ijula 1984 g.)*, доклад M-22.
- 2.17. W. Zielenkiewicz, R. Z. MORAWSKI, J. Hatt, E. Margas, J. Zaslona: "Mikroprocesorowy system zbierania i przetwarzania sygnału kalorymetrycznego", *Mat. III Pol. Konf. Kalorymetrii i Analizy Termicznej (Zakopane, 16–21 września 1984 r.)*, plakat M2.
- 2.18. R. Z. MORAWSKI: "Funkcje modelu matematycznego w procesie projektowania systemu pomiarowego", *Mat. III Sympozjum "Kierunki rozwoju metrologii elektrycznej" (Wilga, 14–15 maja 1981 r.)*, Wyd. IETiME Politechniki Warszawskiej, KE PAN (Sekcja Elektrometrologii), Warszawa 1981, str. 98–105.
- 2.19. J. Kiszurno, W. Jung, J. Marczewski, K. Adamowicz, A. Barwicz, R. Leoniak, R. Z. MORAWSKI, A. Podgórski, W. Winiecki: "Sistema centralnogo upravlenija izmierenijami eleiكتروfizičeskich svojstv poluprovodnikovyh struktur", *Sbornik trudov II Konf. po mikroelektronike soc. stran – MIKROELIEKTRONIKA 80 (Toruń, 14–16 sientabria 1980 g.)*, tom B, str.16–23.
- 2.20. R. Z. MORAWSKI: "Modelirovanie analogo-cifrovych elektronnych schem", *Proc. 24. Inter. Wiss. Koll. TH Ilmenau 1979, Vortragsreihe B3 "Simulation auf Rechnern"*, Heft 5, pp. 119–123.

### **3. Książki i rozdziały w książkach**

- 3.1. R. Z. MORAWSKI: "Metody odtwarzania sygnałów pomiarowych", *Metrologia i Systemy Pomiarowe – Monografie*, zeszyt 1, KMiAN PAN, Warszawa 1989 (wyd. 1), 1990 (wyd. 2), stron 120 (monografia habilitacyjna).
- 3.2. K. Adamowicz, R. Leoniak, R. Z. MORAWSKI, A. Podgórski, E. Porządkowski, W. Winiecki: "Wybrane zagadnienia komputerowej techniki pomiarowej", Wydawnictwo Politechniki Warszawskiej, Warszawa 1982, stron 230 (skrypt akademicki).
- 3.3. E. Porządkowski, R. Z. MORAWSKI, M. Wernik: *Podstawy elektroniki dla kierunku "Transport"*, Wydawnictwo Politechniki Warszawskiej, Warszawa 1979 (skrypt akademicki).
- 3.4. D. Hoffmann: "Błędy pomiaru, prawdopodobieństwo i teoria informacji", [w:] *Podręcznik metrologii – tom I*, WKiŁ, Warszawa 1988, str. 243–276 (przekład z jęz. ang.: R. Z. MORAWSKI, A. Podgórski).
- 3.5. R. Z. MORAWSKI: "Algoritm opriedielienija sostojanija liniejnoj sieti s klučami poslie pierieključenija", [v:] *Projektirovanije sistiem vvoda-vyvoda EVM*, Izd. LGU, Leningrad 1981, str. 92–100.

### **4. Patenty**

- 4.1. R. Leoniak, R. Z. MORAWSKI, K. Adamowicz, W. Winiecki: "Układ sprzęgacza systemowego", Patent #141,960 przyznany w 1988 r.
- 4.2. K. Adamowicz, A. Barwicz, R. Leoniak, R. Z. MORAWSKI, J. Oleński, A. Podgórski, W. Winiecki: "Układ sprzężenia stanowisk pomiarowych z minikomputerem", Patent #122,257 przyznany w 1985 r.