CURRICULUM VITAE

July, 2026

1 PERSONAL DATA

Name: **Paulo Antonio Andrade Esquef**
Gender: Male
Date and place of birth: 14th January 1973, Rio de Janeiro/RJ - Brazil

Work Address: Av. Getulio Vargas, 333
25651-075 Petrópolis – RJ, Brazil
Telephone: (+5524) 8819-7651

Web Addresses: Home page: http://www.lncc.br/~pesquef
Signal processing laboratory: http://lps.lncc.br (in Portuguese)
e-mail: pesquef < at > lncc.br

2 EDUCATION

2000 – 2004

DSc (Tech) in Electrical Engineering – Acoustics and Audio Signal Processing
Helsinki University of Technology (now Aalto University) – Laboratory of Acoustics and Audio Signal Processing, Espoo, Finland.
Thesis: *Model-Based Analysis of Noisy Musical Recordings with Application to Audio Restoration*.
Conclusion: April 2004.
Supervisor: Prof. Dr. Vesa Välimäki.
Research work supported by CNPq-Brazil.

1997 - 1999

MSc in Electrical Engineering – Digital Signal Processing
Federal University of Rio de Janeiro, COPPE/UFRJ, Rio de Janeiro-RJ, Brazil.
Dissertation: Restoration of Audio Signals Degraded by Impulsive Noise (in Portuguese).
Conclusion: March 1999.
Supervisor: Prof. Dr. Paulo Sergio Ramirez Diniz.
Research work supported by CAPES-Brazil.

1992 - 1997

BSc in Electrical Engineering (Electronics)
Federal University of Rio de Janeiro, POLI/UFRJ, Rio de Janeiro-RJ, Brazil.
Conclusion: March 1997.

3 WORK EXPERIENCE

November 2016 – Current

National Laboratory for Scientific Computing (LNCC) – Brazil
Position: Adjoint Researcher (full-time) – Department of Mathematical and Computational Methods (COMAC)
Activities:

- Coordinator of the Signal Processing Laboratory
- Research on digital signal processing and audio DSP
- Production and edition of video-lectures on Digital Signal Processing and Linear Systems
- Supervision of a doctoral student at the Post-Graduate Program in Computational Modeling (LNCC)
  - Thesis topic: Analysis of synchrophasor parameters in power systems (in Portuguese)
- Co-Supervision of a master's student at the Post-Graduate Program in Computational Modeling (LNCC)
  - Dissertation topic: Community detection in large-scale graphs (in Portuguese)
- Teaching at post-graduate level: Digital Signal Processing (10+ editions) and Linear Systems (4 editions)
- Teaching within the LNCC's Summer Program: short courses on audio signal processing. Course material (in Portuguese) available from (http://lps.lncc.br/index.php/cursos)

May 2009 – November 2016

National Laboratory for Scientific Computing (LNCC) – Brazil
Position: Adjoint Researcher (full-time) – Department of Systems and Control (CSC)
Activities:

- Coordinator of the Signal Processing Laboratory
- Member of the Post-graduate Committee (2012-2014)
- Member of the Research and Human Resources Formation Committee - CPFRH
- Research on digital signal processing and audio DSP
- Coordinator of 2 research projects on audio DSP (from 2010 to 2015)
  - Time-frequency analysis of non-stationary signals (CNPq- 475566/2012-2, 3 years, £ 9200 grant by Jan/13)
  - Degradation Pattern Identification in Audio (CNPq- 472856/2010-3, 2 years, £ 7400 grant by Mar/10)
- Supervision of a postdoc researcher on data-driven analysis of multiscale phenomena (from 2010 to 2013).
- Supervision of a doctoral student at the Post-Graduate Program in Computational Modeling (LNCC)
  - Thesis topic: Analysis of the nonlinear dynamics among atmospheric waves
- Supervision of a master's student at the post-graduate course on Physics Engineering – UDELAR, Uruguay.
  - Thesis topic: Synthesis of percussion instruments based on physical modeling
- Teaching at post-graduate level: Digital Signal Processing and Linear Systems
- Teaching within the LNCC's Summer Program: 7 short courses on audio signal processing. Course material (in Portuguese) available from (http://lps.lncc.br/index.php/cursos)

December 2007 – January 2009

Signal Multimedia and Telecommunications Lab (SMT) – PEE-COPPE/UFRJ, Brazil
Position: Researcher (freelance, full-time)
Activities:

- R&D of digital signal processing for quality improvement and assessment of audio signals, within a project involving HP Labs in Palo-Alto and PEE-COPPE/UFRJ.
- Elaboration of technical reports and scientific papers
- Supervision of students enrolled in the MSc program at PEE-COPPE/UFRJ

March 2006 – May 2007

Nokia Institute of Technology (INdT), Manaus, Brazil
Position: Specialist Researcher (full-time)
Activity: Preparation the Annual Account Report to the Ministry of Science and Technology on R&D expenses using Informatics Law funds.

September 2004 – March 2006

Paulo Feitoza Foundation (FPF Tech), Manaus, Brazil
Position: Senior Engineer (full time)
Activities:

- R&D of projects on human-computer interfaces for users with physical disabilities
- Development of an electroculargraphic-based screen cursor control system
- Research on video signal processing for webcam-based screen cursor control
- Elaboration of project proposals and technical reports

January 2001 – April 2004

Laboratory of Acoustics and Audio Signal Processing, Helsinki University of Technology, Espoo, Finland
Position: Researcher (partial time 20h/w)
Activities:

- Research on analysis and synthesis of audio signals with application to audio restoration
- Preparation of scientific papers and presentations
- Teacher assistant in a post-graduate seminar course on audio signal processing
- Member of the ALMA project (Algorithms for Modeling of Acoustic Interactions).
- Associate doctorate student at Pythagoras Graduate School of Music and Sound Research.

June 1999 – June 2000

Signal Multimedia and Telecommunications Lab (SMT), PEE-COPPE, Federal University of Rio de Janeiro, Rio de Janeiro-RJ, Brazil
Position: Research Engineer (full time, under scholarship)
Activities:

- Research and development on analysis and classification of sonar signals
- Preparation of technical reports

March 1997 – March 1999

Signal Multimedia and Telecommunications Lab (SMT), PEE-COPPE, Federal University of Rio de Janeiro, Rio de Janeiro-RJ, Brazil
Position: Research Engineer (full time, under scholarship from CAPES)
Activities:

- Research on analysis and reconstruction of audio signals for restoration of old recordings
- Preparation of scientific papers and presentations

5 LANGUAGES

Portuguese:	native language
English:	fluent
Spanish:	basic level (mostly reading)
French:	basic level (mostly reading)

6 SOCIETIES AND MEMBERSHIPS

Audio Engineering Society (AES), Inc. USA (2001 - 2020)
Institute of Electrical and Electronics Engineering (IEEE), USA (1997 - 2020)

7 OTHER RESEARCH-RELATED ACTIVITIES

1. Regular reviewer of the following journals and conferences:
    a. IEEE Transactions on Audio, Speech, and Language Processing, DAFx, ISMIR, AES Conferences.
2. Member of the organizing committee of the XXXVII Brazilian Symposium on Telecommunications and Signal Processing, as technical committee chair of the signal processing area.

9 SCIENTIFIC PUBLICATIONS

http://www.lncc.br/~pesquef/publications.html
Google Scholar
Researchgate

9.1 Theses

1. P. A. A. **Esquef**, *Model-Based Analysis of Noisy Musical Recordings with Application to Audio Restoration*, D.Sc. Thesis, Helsinki University of Technology (now Aalto University), Laboratory of Acoustics and Audio Signal Processing, Espoo, Finland, Apr. 2004.
2. P. A. A. **Esquef**, *Restauração de Sinais de Áudio Degradados por Ruído Impulsivo*, Master's Thesis, Federal University of Rio de Janeiro (UFRJ), PEE-COPPE, SMT Lab , Rio de Janeiro, RJ, Brazil, 109 pages, Mar. 1999. (in Portuguese)

9.2 Book Chapters

1. P. A. A. **Esquef**, "Audio Restoration", In D. Havelock et al. (Eds), Handbook of Signal Processing in Acoustics. Part VI Audio Engineering, Chapter 40, pp. 773-784, Springer New York, 2008.
2. P. A. A. **Esquef** and L. W. P. Biscainho, "DSP Techniques for Sound Enhancement of Old Recordings," In Hector Meana (Ed.), *Advances in Audio and Speech Signal Processing: Technologies and Applications.* Chapter 4, IGI Global, pp. 93-130, 2007.
3. P. A. A. **Esquef** and L. W. P. Biscainho, "Spectral-Based Analysis and Synthesis of Audio Signals," In Hector Meana (Ed.), *Advances in Audio and Speech Signal Processing: Technologies and Applications*. Chapter 3, IGI Global, pp. 56-92, 2007.

9.3 International Journal Papers

1. G. S. Carnivali, A. B. Vieira, A. Ziviani, and P. A. A. Esquef. "CoVeC: Coarse-grained vertex clustering for efficient community detection in sparse complex networks", in Information Sciences, v. 522, pp. 180-192, June 2020.
2. Martins, M.B., Vasconcellos, R. T. de B., P. A. A. **Esquef**, "Models for Synchrophasor with Step Discontinuities in Magnitude and Phase: Estimation and Performance", in IEEE Transactions on Instrumentation and Measurement, vol. 68, issue 6, pp. 2007-2014, June 2019. DOI: 10.1109/TIM.2019.2893716
3. J. K. Moqadam, G. S. Welter, and P. A. A. **Esquef**, "Multifractality in fidelity sequences of optimized Toffoli gates", in Quantum Information Processing, July 2016. Post-print version.
4. P. A. A. **Esquef**, J. A. Apolinário, Jr., and L. W. P. Biscainho, "Edit Detection in Speech Recordings via Instantaneous Electric Network Frequency Variations", in *IEEE Transactions on Information Forensics & Security*, vol. 9, no. 12, pp. 2314-2326, December 2014. Companion webpage with demonstration scripts and data:http://lps.lncc.br/index.php/demonstracoes/tifs2014.
5. G. S. Welter and P. A. A. **Esquef**, "Multifractal Analysis Based on Amplitude Extrema of Intrinsic Mode Functions," in *Physical Review E*, vol. 87, issue 3, pp. 032916-1 - 032916-8, March, 2013. Matlab scripts available here.
6. B. C. Bispo, P. A. A. **Esquef**, L.W. P. Biscainho, A. de Lima, F. P. Freeland, R. A. de Jesus, A. Said, B. Lee, R. W. Schafer, and T. Kalker, "EW-PESQ: A Quality Assessment Method for Speech Signals Sampled at 48 kHz," in the *Journal of the Audio Engineering Society*, vol 58, no. 4, pp. 251 - 268, April 2010.
7. R. Milovanov, P. Pietilä, M. Tervaniemi, and P. A. A. **Esquef**, "Foreign Language Pronunciation Skills and Musical Aptitude: A Study of Finnish Adults with Higher Education", in *Learning and Individual Differences*, vol. 20, issue 1, pp. 56-60, February 2010.
8. L. O. Nunes, P. A. A. **Esquef**, and L. W. P. Biscainho, "FlexSM: a Flexible Sinusoidal Modeling System", Engineering Report in the *Journal of the Audio Engineering Society*, vol 57, no. 12, pp. 1042 - 1056, December 2009.
9. R. Milovanov, M. Huotilainen, P. A. A. **Esquef**, P. Alku, V. Välimäki, and M. Tervaniemi, "The role of musical aptitude and language skills in preattentive duration processing in school-aged children," in *Neuroscience Letters*, vol. 460, Issue 2, pp. 161-165, August 2009.
10. R. Milovanov, M. Huotilainen, V. Välimäki, P. A. A. **Esquef**, and M. Tervaniemi, "Musical aptitude and second language pronunciation skills in school-aged children: neural and behavioral evidence," *Brain Research*, vol. 1194, no. 15, pp. 81-89, February 2008.
11. P. A. A. **Esquef** and L. W. P. Biscainho, "An Efficient Model-Based Method for Reconstruction of Audio Signals across Long Gaps", *IEEE Trans. Audio, Speech, and Language Processing,* vol. 14, no. 4, pp. 1391-1400, July 2006.
12. P. A. A. **Esquef**, M. Karjalainen, and V. Välimäki, "Frequency-Zooming ARMA Modeling for Analysis of Noisy String Instrument Tones", *EURASIP Journal on Applied Signal Processing* - *Special Issue on Digital Audio for Media Communications*, vol. 2003, no. 10, pp. 953-967, September 2003.
13. P. A. A. **Esquef**, L. W. P. Biscainho, and V. Välimäki, "An Efficient Algorithm for the Restoration of Audio Signals Corrupted with Low-Frequency Pulses", *Journal of the Audio Engineering Society*, vol. 51, no. 6, pp. 502-517, June 2003.
14. M. Karjalainen, P. A. A. **Esquef**, P. Antsalo, A. Mäkivirta, and V. Välimäki, "Frequency-Zooming ARMA Modeling of Resonant and Reverberant Systems," *Journal of the Audio Engineering Society*, vol. 50, no. 12, pp. 1012-1029, December 2002.
15. P. A. A. **Esquef**, V. Välimäki, and M. Karjalainen, "Restoration and enhancement of solo guitar recordings based on sound source modeling," *Journal of the Audio Engineering Society*, vol. 50, no. 4, pp. 227-236, April 2002. (Version with enhanced equation fonts) Companion webpage with data.

9.4 International Conference Papers

1. M. B. Martins, P. A. A. **Esquef**, R. T. de B. Vasconcellos, "Classification and Characterization of a Step Change in the Magnitude or Phase of an AC Signal", **accepted for publication** in Proc. 2026 IEEE 13th International Workshop on Applied Measurements for Power Systems (AMPS), Valencia, Spain, September 29-October 1, 2026. Companion Webpage.
2. Americo Cunha Jr., Emanuelle Arantes Paixão, P. A. A. **Esquef**, Marcelo Rubens do Amaral, "Learning Dengue Dynamics through Hybrid Equation-Guided and Data-Driven Models", in AI&PDE: ICLR 2026 Workshop on AI and Partial Differential Equations, April 23-27, Rio de Janeiro, Brazil, 2026.

3. M. B. Martins, P. A. A. **Esquef**, R. T. de B. Vasconcellos, "Enhanced Step Location in the Magnitude and Phase of an AC Signal via Polynomial Approximation Total Variation (PATV) Filtering", in Proc. 2023 IEEE 13th International Workshop on Applied Measurements for Power Systems (AMPS), Bern, Switzerland, September 27-29, 2023. Companion Webpage.
4.
5. M. B. Martins, R. T. de B. Vasconcellos, P. A. A. **Esquef**, "Step Change Detection Based on Analytic Signal for PMU Calibrators", in 10th IEEE International Workshop on Applied Measurements for Power Systems (AMPS), Aachen, Germany, September 25-27, 2019.
6. P. A. A. **Esquef**, J. A. Apolinário, Jr., and L. W. P. Biscainho, "Improved Edit Detection in Speech via ENF Patterns", in *Proc. of the 7th IEEE International Workshop on Information Forensics and Security (WIFS)*, Rome, November 16-19, 2015, PID-3. Companion webpage with demos, databases & codes.
7. P. A. A. **Esquef** and G. S. Welter, "Audio De-Thumping Using Huang's Empirical Mode Decomposition", in *Proc. of the 14th International Conference on Digital Audio Effects*, pp. 401-408, Paris, France, September 19-23, 2011.
8. L. O. Nunes, L. W. P. Biscainho, and P. A. A. **Esquef**, "A Database of Partial Tracks for Evaluation of Sinusoidal Models," in the online *Proc. of the 13th International Conference on Digital Audio Effects (Young Research and Student Forum)*, Austria, September, 2010.
9. P. A. A. **Esquef**, L. W. P. Biscainho, L. O. Nunes, B. Lee, A. Said, A. Kalker, and R. W. Schafer, "Quality Assessment of Audio: Increasing Applicability Scope of Objective Methods via Prior Identification of Impairment Types," in Proc. *IEEE International Workshop on Multimedia Signal Processing*, PID-148, Rio de Janeiro, Brazil, October 5-7, 2009.
10. L. W. P. Biscainho, P. A. A. **Esquef**, F. P. Freeland, L. O. Nunes, A. F. Tygel, B. Lee, A. Said, T. Kalker, and R. W. Schafer, "An Objective Method for Quality Assessment of Ultra-Wideband Speech Corrupted by Echo," in the Proc. *IEEE International Workshop on Multimedia Signal Processing*, PID-149, Rio de Janeiro, Brazil, October 5-7, 2009. **Recipient of the Top 10% Paper Award.**
11. A. A. de Lima, F. P. Freeland, P. A. A. **Esquef**, L. W. P. Biscainho, B. C. Bispo, R. A. de Jesus, S. L. Netto, R. W. Schafer, A. Said, B. Lee, and A. Kalker, "Reverberation Assessment in Audioband Speech Signals for Telepresence Systems," in *Proc. International Conference on Signal Processing and Multimedia Applications*, pp. 257-262, Porto, Portugal, July 26-29, 2008.
12. L. O. Nunes, P. A. A. **Esquef**, L. W. P. Biscainho, and R. Merched, "Partial Tracking in Sinusoidal Modeling: An Adaptive Prediction-Based RLS Lattice Solution," in *Proc. International Conference on Signal Processing and Multimedia Applications*, pp. 84-91, Porto, Portugal, July 26-29, 2008.
13. M. Karjalainen, J. Pakarinen, C. Erkut, P. A. A. **Esquef**, and V. Välimäki, "Recent Advances in Physical Modeling with K- and W-Techniques," in *Proc. 7th International Conference on Digital Audio Effects (DAFx'04)*, pp. 107-112, Naples, Italy, October 5-8, 2004.
14. K. Roth, I. Kauppinen, P. A. A. **Esquef**, and V. Välimäki, "Frequency Warped Burg's Method for AR-Modeling", in *Proc. 2003 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics* (WASPAA'03), pp. 05-08, New Paltz, NY, USA, October 19-22, 2003.
15. P. A. A. **Esquef**, V. Välimäki, K. Roth, and I. Kauppinen, "Interpolation of Long Gaps in Audio Signals Using the Warped Burg's Method", in *Proc. 6th Int. Conf. Digital Audio Effects*(DAFx-03), pp. 18-23 London, UK, September 8-11, 2003.
16. M. Karjalainen, P. A. A. **Esquef**, and V. Välimäki, "Making of a Computer Carillon", in *Proc. Stockholm Music Acoustics Conference* (SMAC 03), pp. 339-342, Stockholm, Sweden, August 6-9, 2003.
17. M. Karjalainen, V. Välimäki, and P. A. A. **Esquef**, "Efficient Modeling and Synthesis of Bell-Like Sounds," in *Proc. 5th International Conference on Digital Audio Effects* (DAFx-02), pp. 181-186, Hamburg, Germany, September 26-28, 2002.
18. P. A. A. **Esquef**, M. Karjalainen, and V. Välimäki, "Detection of Clicks in Audio Signals Using Warped Linear Prediction", in *Proc. 14th IEEE Int. Conf. on Digital Signal Processing (DSP2002)*, vol. 2, pp. 1085-1088, Santorini, Greece, July 01-03, 2002.
19. P. A. A. **Esquef**, L. W. P. Biscainho, V. Välimäki, and M. Karjalainen, "Removal of Long Pulses from Audio Signals Using Two-pass Split Window Filtering", presented at the 112th AES Convention, preprint no. 5535, Munich, Germany, May 10-13, 2002. Companion webpage with data and demos.
20. M. Karjalainen, P. A. A. **Esquef**, P. Antsalo, A. Mäkivirta, and V. Välimäki, "AR/ARMA Analysis and Modeling of Modes in Resonant and Reverberant Systems", presented at the 112th AES Convention, preprint no. 5590, Munich, Germany, May 10-13, 2002.
21. P. A. A. **Esquef**, V. Välimäki, and M. Karjalainen, "Restoration and enhancement of instrumental recordings based on sound source modeling," presented at the AES 110th Convention, preprint 5331, Amsterdam, The Netherlands, May 12-15, 2001. Companion webpage.

22. L. W. P. Biscainho, P. S. R. Diniz, and P. A. A. **Esquef**, "ARMA processes in sub-bands with application to audio restoration," in *Proc. 2001 IEEE Int. Symp. Circ. and Syst.* (ISCAS'01), vol. 2, pp. 157-160, Sydney, Australia, May 6-9, 2001.
23. L. W. P. Biscainho, P. S. R. Diniz, and P. A. A. **Esquef**, "A Model for an ARMA Process Split in Subbands," in *Proc. Int. Symp. Circ. and Syst.* (ISCAS'00), Geneve, Switzerland, vol. III, pp. 97-100, 2000.
24. P. A. A. **Esquef**, L. W. P. Biscainho, P. S. R. Diniz, and F. P. Freeland, "A Double-Threshold-Based Approach to Impulsive Noise Detection in Audio Signals," in *Proc. X European Signal Processing Conf.* (EUSIPCO 2000), pp. 2041-2044, Tampere, Finland, September 2000.
25. L. W. P. Biscainho, F. P. Freeland, P. A. A. **Esquef**, and P. S. R. Diniz, "Wavelet Shrinkage De-noising Applied to Real Audio Signals under Perceptual Evaluation," in *Proc. X European Signal Processing Conf.* (EUSIPCO 2000), pp. 2061-2064, Tampere, Finland, September 2000.

9.5 National Conference Papers & Technical Reports

1. G. S. Carnivali, Alex B. Vieira, Paulo A. A. **Esquef**, e Artur Ziviani, "Método Rápido de Agrupamento de Vértices para Detecção de Comunidades em Redes Complexas de Larga-escala", in Proc. 17th Workshop on Performance of Computation and Communication Systems (WPerformance), CSBC 2018, pp. 260-273, Natal-RN, 22-26 de July, 2018. **Honorable Mention.** Webpage with codes and links to databases (in Portuguese).
2. G. S. Welter, P. A. A. **Esquef**, L. G. N. Martins, O. C. Acevedo, and G. A. Degrazia, "Correlações no Domínio Tempo-frequência", in *Revista Ciência e Natura* - *Micrometeorologia, Edição Suplementar*, vol. 33, no. 1, pp. 103-106, November 2011. (in Portuguese).
3. J. C. P. Filho, P. A. A. **Esquef**, and L. W. P. Biscainho, "Classificação Automática de Sons de Instrumentos Musicais Usando Discriminantes Lineares", in *Proc. 6th AES-Brazil Conference*, pp. 112-118, São Paulo, Brazil, May 2008 (in Portuguese).
4. L. O. Nunes, P. A. A. **Esquef**, and L. W. P. Biscainho, "Evaluation of Threshold-Based Algorithms for Detection of Spectral Peaks in Audio," in *Proc. 5th AES-Brazil Conference*, pp. 66-73, São Paulo, Brazil, May 2007.
5. P. A. A. Esquef, R. Caetano, "ROCC - A Webcam-Mouse for People with Disabilities," in *Proc. XXV Brazilian Telecommunications Symposium*, Recife, Brazil, September 2007.
6. P. A. A. **Esquef**, "Interpolação de Sinais de Áudio Usando Polinômios do Par de Linhas Espectrais", in *Proc 2nd AES-Brazil Conference*, São Paulo, Brazil, June 2004 (in Portuguese).
7. P. A. A. **Esquef**, "Interpolation of Long Gaps in Audio Signals Using Line Spectrum Pair Polynomials" Tech. Report 72, Laboratory of Acoustics and Audio Signal Processing, Helsinki University of Technology, Espoo, Finland, February 2004.
8. P. A. A. **Esquef** and V. Välimäki, "Design of an Efficient Inharmonic Digital Waveguide Filter for Synthesis of Hand-Bell Sounds," in *Proc. 2003 Finnish Signal Processing Symp.*(FINSIG'03), pp. 49-53, Tampere, Finland, May 19, 2003.
9. P. A. A. **Esquef**, V. Välimäki, and M. Karjalainen, "Audio restoration using sound source modeling," in *Proc. 2001 Finnish Signal Processing Symp*. (FINSIG'01), pp. 47-50, Espoo, Finland, June 5, 2001.
10. L. W. P. Biscainho, P. S. R. Diniz, and P. A. A. **Esquef**, "Investigação do Modelo para um Processo ARMA Dividido em Sub-bandas," in *Proc 13th Brazilian Conf. on Automatics* (CBA), Florianópolis, SC, Brazil, pp. 580-585, 2000. (in Portuguese)
11. P. A. A. **Esquef**, L. W. P. Biscainho, and P. S. R. Diniz, "Detecção de Pulsos Longos em Sinais de Áudio," in *Proc. XVII Brazilian Symp. on Telecommunications* (SBrT), Vila Velha, Brazil, pp. 191-196, 1999. (in Portuguese)
12. L. W. P. Biscainho, P. S. R. Diniz, and P. A. A. **Esquef**, "Aspectos da Detecção de Distúrbios Impulsivos em Sinais de Áudio Usando Técnicas Baseadas em Limiar," in *Proc. XVII BrazilianSymp. on Telecommunications* (SBrT), Vila Velha, Brazil, pp. 185-190, 1999. (in Portuguese)
13. P. A. A. **Esquef**, and A. C. M. de Queiroz, "Implementação em DSP de um Sistema para Análises LOFAR e DEMON", *in Proc. IV Technology Meeting on Submarine Acoustics*, Rio de Janeiro, Brazil, 1999 (in Portuguese).

Petrópolis, July 28th, 2026

Documento assinado digitalmente
gov.br
PAULO ANTONIO ANDRADE ESQUEF
Data: 28/07/2026 15:56:48-0300
Verifique em https://validar.iti.gov.br