

B. List of publications in 2022

B.1 Books

Jacobo de Uña-Álvarez, Carla Moreira, Rosa M. Crujeiras; “The Statistical Analysis of Doubly Truncated Data: With Applications in R”, John Wiley & Sons, 2022.

B.2 Papers in peer review journal

1. Ahues M., Dias De Almeida F., Fernandes R., Vasconcelos P.B., Two Singularity Subtraction Schemes for a Class of Nonlinear Weakly Singular Integral Equations, *Numerical Functional Analysis and Optimization*, 43, 1114–1139, 2022. (SJR=0,52 Q2)
2. Almeida, J., Costa, J.C., Zeitoun, M., Recognizing pro-R closures of regular languages, *Forum Mathematicum 3* (2022), 1131 – 1145. (SJR=0.853 Q1)
3. Almeida D.Q., Paciência I., Moreira C., Rufo J.C., Moreira a., Santos A.C., Barros H., Ribeiro A.I., Green and blue spaces and lung function in the Generation XXI cohort: a life-course approach, *European Respiratory Journal*, 60, 2022 (SJR=4.336 Q1)
4. Avelino C.P., Santos A.F., S2 coverings by isosceles and scalene triangles - adjacency case II, *Ars Mathematica Contemporanea*, 22, 2022 (SJR=0.741 Q2)
5. Baraviera A., Duarte P., Torres, M. J., Stationary measures on infinite graphs, *Communications in Contemporary Mathematics*, 24, 2150025, 1–33, 2022. (SJR=1,36 Q1)
6. Brito I., The normalized expected utility – entropy and variance model for decisions under risk, *International Journal of Approximate Reasoning*, 148, 174 – 201, 2022 (SJR =1.07 Q1)
7. Catarino, P., De Almeida, R., A Note on Vietoris' Number Sequence, *Mediterranean Journal of Mathematics*, 19, 1–19, 2022. (SJR=0,59 Q2)

8. Catarino, P., Alves, F.R., Campos, H., On Hyper k-Pell, Hyper k-Pell-Lucas and Hyper Modified k-Pell sequences, *Integers* 22 (2022), 1 – 14. (SJR=0.26 Q4)
9. Catarino, P., Ricardo, S., On Quaternion Gaussian Bronze Fibonacci Numbers, *Annales Mathematicae Silesianae* 36, 129 – 150. (SJR=0.12 Q4)
10. Costa, J.C., Nogueira, C., Teixeira, M.L., The Overlap Gap between Left-Infinite and Right-Infinite Words, *International Journal of Foundations of Computer Science* 33 (2022), 45 – 53. (SJR=0.39 Q2)
11. Della Marca R., Groppi M., Soares, A.J., Human-induced oscillations in a network landscape model, *Communications in Nonlinear Science and Numerical Simulation*, 115, 1–15, 2022 (SJR=1,146 Q1)
12. Della Marca R., Machado Ramos M.P., Ribeiro C., Soares A.J., Mathematical modelling of oscillating patterns for chronic autoimmune diseases, *Mathematical Methods in the Applied Sciences*, 45, 7144–7161, 2022. (SJR=0,7 Q1)
13. Djebbar, B., Ferreira, A.C., Fino, A., Larbi Youcef, N. Z., Locally conformal SKT structures, *International Journal of Mathematics*, 33(14), 2250092, 2022 (SJR=0.612 Q2)
14. Espírito Santo J., Pinto L., Uustalu T., Plotkin's call-by-value λ -calculus as a modal calculus, *Journal of Logical and Algebraic Methods in Programming*, 127 (2022). (SJR=0.615 Q2)
15. Fernandes C., Faroughi S.A., Ferrás L.L., Afonso A.M., Advanced Polymer Simulation and Processing, *Polymers*, 14, 2022 (SJR=0,73 Q1)
16. Ferreira, C., Parlett, B., A real triple dqds algorithm for the nonsymmetric tridiagonal eigenvalue problem, *Numerische Mathematik* 150 (2022), 373 – 422. (SJR=1.742 Q1)
17. Ferreira H., Ferreira M., The stopped clock model, *Dependence Modeling*, 10, 48 – 57, 2022 (SJR=0.438 Q3)
18. Ferreira H., Ferreira M., A new blocks estimator for the extremal index, *Communications in Statistics - Theory and Methods*, 2022 (SJR=0.435 Q3)
19. Ferreira J.J., Meira-Machado L., Insertion Torque Value and Implant Stability Quotient: Separate Evaluation and Correlation for Different Clinical Parameters, *International Journal of Oral and Maxillofacial Implants*, 37, 812 – 822, 2022 (SJR=0.940 Q1)

20. Filipe, V., Teixeira, P, Teixeira, A., Automatic Classification of Foot Thermograms Using Machine Learning Techniques, *Algorithms*, 15, 2022 (SJR=0.515 Q2)
21. Fornaro S., Henriques E., Vespri V., Stability to a class of doubly nonlinear very singular parabolic equations, *Manuscripta Mathematica*, 168, 165–179, 2022. (SJR=0,709 Q2)
22. Gago M.F., Ferreira F., Bicho E., Quantitative gait analysis value as a predictor of shunt surgery effectiveness in normal pressure hydrocephalus: A technical note, *Clinical Neurology and Neurosurgery*, 221, 2022. (SJR=0,571 Q2)
23. Gonçalves, A.M., Malheiro, M.T., Veiga J., Lima S., Silva L., Carneiro V.H., Pinhão M., Sampaio A..M., Meireles J., Pontes A., Machado J., A Novel Route to Optimize Placement Equipment Kinematics by Coupling Capacitive Accelerometers, *Sensors*, 22, 1–15, 2022. (SJR=0,803 Q1)
24. Henriques E., Expansion of positivity to a class of doubly nonlinear parabolic equations, *Electronic Journal of Qualitative Theory of Differential Equations*, 15, 1–24, 2022. (SJR=0,407 Q3)
25. Herdeiro C.A.R., Pombo A.M., Radu E., Oliveira, J., Deconstructing scaling virial identities in general relativity: Spherical symmetry and beyond, *Physical Review D*, 106, 2022 (SJR=1.68 Q1)
26. Johnson, C., Waugh, M., Zhang, Y., Tree sign pattern that permit eventual positivity, *Linear Algebra and Its Applications* 650 (2022), 162 – 168. (SJR=0.88 Q1)
27. Kahl T., On symmetric higher-dimensional automata and bisimilarity, *Theoretical Computer Science*, 935, 47 – 60, 2022 (SJR=0.621 Q2)
28. Karim, A.O.; Shehata, E.M.; Cardoso, J.L., Cardoso, J.L., The Directional Derivative in General Quantum Calculus, *Symmetry*, 14, 1–13, 2022. (SJR=0,54 Q2)
29. Köme, C., Sure, K., Catarino, P., Quantum Calculus Approach to the Dual Bicomplex Fibonacci and Lucas Numbers, *Journal of Mathematical Extension* 16 (2022), 1 – 19 (IF=0.4 Q4).
30. Lima P.M., Erhagen W., Kulikova M.V., Kulikov G.Y., Numerical solution of the stochastic neural field equation with applications to working memory, *Physica A: Statistical Mechanics and its Applications*, 596, 127166, 1–29, 2022. (SJR=0,891 Q1)

31. Lima P.M., Erhagen W., Kulikova M.V., Kulikov G.Y., Kamkar S., Abrishami Moghadam H., Lashgari R., Erhagen W., Brain-inspired multiple-target tracking using Dynamic Neural Fields, *Neural Networks*, 151, 121–131, 2022. (SJR=2,781 Q1)
32. Liu, Z., Zhang, F., Ferreira, C., Zhang, Y., On circulant and skew-circulant splitting algorithms for (continuous) Sylvester equations, *Computers and Mathematics with Applications* 109 (2022), 30 – 43. (SJR=0,984 Q1)
33. Maia I., Moreira C., Ramos E., Santos A.C., The effect of non-participation on the prevalence of food insecurity in a population-based cohort in Portugal, *Journal of Public Health Policy*, 43, 391 – 402, 2022 (SJR=0.832 Q2)
34. Manguiera, M.C. dos S., Vieira, R.P.M., Alves, F.R.V., Catarino, P., Leonardo's bivariate and complex polynomials, *Notes on Number Theory and Discrete Mathematics* 28 (2022), 115 – 123 (IF=0.4 Q4).
35. Manguiera, M.C. dos S., Vieira, R. P. M., Alves, F. R. V., Catarino, P., Sousa, R. T. de., Two-dimensional, three-dimensional, and N-dimensional recurrence relations of Jacobsthal, *Integers* 22 (2022), 1 – 15 (SJR=0.26 Q4)
36. Marques A., Cunha A., Faria S., Silva F.S., Carvalho O., Predictive models on the influence of laser texturing parameters on the Inconel 718 surface by using Nd: YVO4 laser, *Optics and Laser Technology*, 154, 2022 (SJR=0.848 Q1)
37. Martins A.P., Ferreira H., Ferreira M., A new random field on lattices, *Statistics and Probability Letters*, 186, 2022 (SJR=0.464 Q3)
38. Mena, F. C., Fontana R.D.B., Quasinormal modes and stability of accelerating Reissner-Norsdröm AdS black holes, *Journal of High Energy Physics*, 2022 (SRJ=6.376 Q1)
39. Mena, F. C., Bertolami O., Lima M.M., Primordial magnetic fields in theories of gravity with non-minimal coupling between curvature and matter, *General Relativity and Gravitation*, 54, 2022 (SRJ=0.878 Q1)
40. Mendes-Gonçalves, S., Mendes Araújo, C, Injective linear transformations with equal gap and defect, *Bulletin of the Australian Mathematical Society* 105 (2022), 106 – 116. (SJR=0.508 Q2)
41. Miranda G., Faria S., Bartolomeu F., Pinto E., Alves N., Silva F.S., The Influence of Laser Power and Scan Speed on the Dimensional Accuracy of Ti6Al4V Thin-Walled Parts Manufactured by Selective Laser Melting, *Metals*, 12, 2022 (SJR=0.569 Q1)

42. Noivo, A., Amorim, A.P., Guimarães, E., Janeira, M.A., Ball screen effectiveness in elite women's basketball , *Journal of Physical Education and Sport* , 22, 757 – 766, 2022 (SJR=0.314 Q4)
43. Novais L., Faria S., Robust order selection of mixtures of regression models with random effects, *Computational Statistics*, 2022 (SJR=0.540 Q2)
44. Oliveira J.J., Global exponential stability of discrete-time Hopfield neural network models with unbounded delays, *Journal of Difference Equations and Applications*, 28, 725–751, 2022. (SJR=0,46 Q2)
45. Oliveira J.J., Global stability criteria for nonlinear differential systems with infinite delay and applications to BAM neural networks, *Chaos, Solitons and Fractals*, 164, 2022. (SJR=1,647 Q1)
46. Oliveira R., Freitas L., Costa D., Vicente J., Gonçalves A.M., Malheiro T., Machado J., A Systematic Analysis of Printed Circuit Boards Bending during In-Circuit Tests, *Machines*, 10, 1–16, 2022. (SJR=0,523 Q2)
47. Pereira R.M., Lopes S.O., Costa M.F., Haie N., Fontes F.A., Modelling of smart irrigation with replan and redistribution algorithms, *Journal of Sustainable Development of Energy, Water and Environment Systems*, 10, 1 – 17, 2022 (SJR=0.424 Q2)
48. Ramos M.P.M., Soares A.J., Oliveira, J., Rarefied relativistic polyatomic gases in a gravitational field, *Continuum Mechanics and Thermodynamics*, 34, 681–695, 2022. (SJR=0,953 Q1)
49. Roca-Pardiñas J., Ordóñez C., Meira-Machado L., A method for determining groups in nonparametric regression curves: Application to prefrontal cortex neural activity analysis, *Mathematical Biosciences and Engineering*, 19, 6435 – 6454, 2022 (SJR=0.509 Q2)
50. Silva D., Galvanin E.A.S., Menezes R., Spatio-temporal analysis of land use/land cover change dynamics in Paraguai/Jauquara Basin, Brazil, *Environmental Monitoring and Assessment*, 194, 2022 (SJR=0.623 Q2)
51. Soutinho G., Meira-Machado L., Methods for checking the Markov condition in multi-state survival data, *Computational Statistics*, 37, 751 – 780, 2022 (SJR=0.540 Q2)
52. Soutinho G., Meira-Machado L., Parametric landmark estimation of the transition probabilities in survival data with multiple events, *WSEAS Transactions on Mathematics*, 21,

207 – 217, 2022 (SJR=0.160 Q4)

53. Soutinho G., Meira-Machado L., Nonparametric estimation of the distribution of gap times for recurrent events, *Statistical Methods and Applications*, 2022 (SJR=0.410 Q3)
54. Teixeira R., Rodrigues C., Moreira C., Barros H., Camacho R., Machine learning methods to predict attrition in a population-based cohort of very preterm infants, *Scientific Reports*, 12, 2022 (SJR=1.005 Q1)
55. Vieira, R.P.M., Alves, F.R.V., Catarino, P., Combinatorial Interpretation of Numbers in Generalized Padovan Sequence and some of its Extensions, *Axioms* 11 (2022), 1 – 9. (SJR= 0.44 Q3)

B.3 Papers accepted for publication

1. Falcão M.I., Miranda F., Severino R., Soares M.J., Dynamics of the coquaternionic maps $x^2 + bx$, *Rendiconti del Circolo Matematico di Palermo*, 2022. (SJR=0,395 Q2)
2. Johnson, C., Zhang, Y., Qiu, F., Ferreira, C., Inseparable Gershgorin Discs and the Existence of Conjugate Complex Eigenvalues of Real Matrices, *Linear and Multilinear Algebra*.

B.4 Book chapters

1. Antosz K., Gola A., Paśko Ł., Malheiro T., Gonçalves A.M., Varela L., Six Sigma and Random Forests Application for Product Quality System Control Development, *Lecture Notes in Mechanical Engineering*, 99 – 112, 2022.
2. Costa M.F., Rocha A.M., Fernandes E., A Kernel Clustering Algorithm Based on Diameters, In: A.I. Pereira et al. (eds) *International Conference on Optimization, Learning Algorithms and Applications - OL2A 2022*. *Communications in Computer and Information Science*, 1754, 442–456. Springer, 2022.
3. Patidar A., Sharma M., Agrawal R., Sangwan K.S., Jamwal A., Gonçalves, A.M., Sustainable Supply Chain Research and Key Enabling Technologies: A Systematic Literature Review and Future Research Implications, *Lecture Notes in Mechanical Engineering*, 305 – 319, 2022.

4. Pires, L.F., Gonçalves, A.M., Ferreira, L.F., Maranhão, L., Gonçalves, A.M., Pires L.F., Ferreira L.F., Maranhão L., Forecasting Models: An Application to Home Insurance, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 13377, 514 – 529, 2022.

B.5 Proceedings in meetings with referee

1. Barbosa P., Ferreira F., Fernandes C., Erlhagen W., Guimarães P., Wojtak W., Monteiro S., Bicho E., Endowing Intelligent Vehicles with the Ability to Learn User's Habits and Preferences with Machine Learning Methods, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), vol. 13756, 157–169, 2022.
2. Brito, I., Leão, C.P., Rodrigues, M.A., Risk Analysis and Risk Measures Applied to the Furniture Industry. In: Machado J., Soares F., Trojanowska J., Ottaviano E. (Ed.), Innovations in Mechanical Engineering. *icieng* 2021. Lecture Notes in Mechanical Engineering, 113-121, Springer, Cham, (2022).
3. Brito, I., Leão, C.P., Rodrigues, M.A., Risk Assessment in Industry Using Expected Utility: An Application to Accidents' Risk Analysis. In: Machado, J. et al. Innovations in Mechatronics Engineering II. *icieng* 2022. Lecture Notes in Mechanical Engineering, 98-110, Springer, Cham, (2022).
4. Cação I., Falcão M.I., Malonek H.R., Tomaz G., Non-symmetric Number Triangles Arising from Hypercomplex Function Theory in R^{n+1} , Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 13377, 420–434, 2022. 22nd International Conference on Computational Science and Its Applications, ICCSA 2022, Malaga, July 4-7 (2022).
5. Castro C., Amorim A.P., A Note on Kendall's Tau Coefficient for Gap Times in Presence of Right Censoring, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), Proceedings of ICCSA 2022, 13377, 481 – 497, 2022.
6. Costa, M.F.P., Coelho C., Ferrás, L.L., Optimisation Approach for Parameter Estimation of the Generalised PTT Viscoelastic Model, Lecture Notes in Computer Science

- (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 12950, 481–494, 21st International Conference on Computational Science and Its Applications Online, September 13-16 (2021).
7. Falcão M.I., Miranda F., Severino R., Soares M.J., A Modified Quaternionic Weierstrass Method, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), vol.13377, 407–419, 2022.
 8. Falcão M.I., Miranda F., Severino R., Soares M.J., Fixed Points for Cubic Coquaternionic Maps, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), vol.13377, 450–465, 2022.
 9. Falcão M.I., Miranda F., Severino R., Soares M.J., Remarks on the Zeros of Quadratic Coquaternionic Polynomials, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), vol.13377, 466–477, 2022.
 10. Ferreira F., Soares J., Sousa F., Magalhães F., Ribeiro I., Pinto D., Pacheco P., A Meta-analysis Approach for Estimating Salary Mean and Its Confidence Interval, Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics), 13377, 627–639, 2022. 22nd International Conference on Computational Science and Its Applications , ICCSA 2022, Malaga, Spain, July 4-7 (2022).
 11. Filipe, V., Teixeira, P., Teixeira, A., Two Clustering Methods for Measuring Plantar Temperature Changes in Thermal Images., Proceedings of International Conference on Optimization, Learning Algorithms and Applications 2022, 261 – 274, 2022.
 12. Guimarães, P., Ferreira F., Silva A.C., Erlhagen W., Monteiro S., Bicho E., A Data Recording Mobile Application to Create Datasets of Vehicle Users' Routines, IEEE International Conference on Autonomous Robot Systems and Competitions, ICARSC 2022, 167–172, 2022. Santa Maria da Feira, Portugal, April 29-30, 2022.
 13. Gonçalves, A.M., Malheiro, M.T., Pereira, Paulo A., Caldeira, A., Lopes, S.O., Pereira R.M.S., Araújo N., Pereira P.A., Water Management in Several Types of Soil – A Hands-On Science Experiment for Students, Lecture Notes in Networks and Systems, vol. 390, 956–967, 2022.

14. Lourenço-Gomes M., Castro C., Amorim A.P., Gitanna B., Tracking participants' behaviour when performing linguistic tasks, ExLing 2022, Proceedings of 13th International Conference of Experimental Linguistics, – 101, 2022.
15. Morgado M.L., Rebelo M., Ferrás L.L., Finite Difference Schemes with Non-uniform Time Meshes for Distributed-Order Diffusion Equations, Lecture Notes in Networks and Systems, vol. 452, 239–244, 2022.
16. Pereira F., Freitas L., Oliveira R., Vicente J., Malheiro T., Gonçalves A.M., Machado J., Malheiro, M.T., Design of a Vision System for Needles' Beds Positioning Inspection: An Industrial Application, Lecture Notes in Mechanical Engineering, 138 – 153, 2022.
17. Pereira F.C., Gonçalves A.M., Costa M., Outliers Impact on Parameter Estimation of Gaussian and Non-Gaussian State Space Models: A Simulation Study, Engineering Proceedings, 18, 1 – 10, 2022.
18. Santos M., Borges A., Carneiro D., Ferreira F., Time Series Analysis for Anomaly Detection of Water Consumption: A Case Study, Lecture Notes in Mechanical Engineering, 234–245, 2022.
19. Silva E.C.E., Gulletta G., Bicho E., Erlhagen W., Statistical analysis on the human-likeness of 3D reaching movements in humanoid robots, AIP Conference Proceedings, 2611, 090005, 2022. International Conference of Computational Methods in Sciences and Engineering, ICCMSE 2021, Heraklion, September 4-7 (2021).
20. Silva L., Meireles J., Pinhão M., Gonçalves A.M., Malheiro M.T., Pick-Up and Placement Improvement: An Industrial Case Study, Lecture Notes in Mechanical Engineering, 285–301, 2022.
21. Silva L., Lima S., Meireles J., Pinhão M., Gonçalves A.M., Malheiro M.T., Machado J., A Systematic Analysis of an Industrial Pickup and Placement Production System, EAI/Springer Innovations in Communication and Computing, 479–491, 2022.
22. Soares, A.J., Ramos, M.P.M., Ribeiro, C., Kinetic modelling of autoimmune diseases, Springer INdAM Series – Recent Advances in Kinetic Equations and Applications, 48, 309–326, 2022. Recent Advances in Kinetic Equations and Applications, Rome, Italy, November 11-15 (2019).
23. Teixeira, A., De Almeida, R., On the Complexity of a Linear Programming Predictor-Corrector Algorithm Using the Two Norm Neighborhood, Communications in Computer

and Information Science , 1754, 532–545, 2022. OL2A 2022: Optimization, Learning Algorithms and Applications, Póvoa de Varzim, Portugal, October 24-25 (2022)

B.6 Other publications

1. Alves, F.R.V., Catarino, P., A sequência de Padovan ou de Coordonier, *Revista Brasileira de História da Matemática* 22 (2022), 21 – 43.
2. Alves, F.R.V., Catarino, P., Brasil x Portugal: Pesquisas desenvolvidas no âmbito do ensino da História da Matemática sobre sequências numéricas recorrentes, *Revista de História da Educação Matemática* 8 (2022), 1 – 23.
3. Assumma V., Bottero M., De Angelis E., Lourenço J.M., Monaco R., Soares A.J., Scenario building model to support the resilience planning of winemaking regions: The case of the Douro territory (Portugal), *Science of the Total Environment*, 838, 1–12, 2022.
4. Baraviera A., Duarte P., Torres M.J., Stationary measures on infinite graphs, *Wolfram Notebook Archive* (2022)
5. Chivai, C.H., Soares, A.A., Catarino, P., Cube test applied to the study of orthogonal projections: spatial development promoted by Qubism 3D Modelling, *Open Education Studies* 4 (2022), 356 – 366. (SJR=0.17 Q3)
6. Chivai, C.H., Soares, A.A., Catarino, P., Application of GeoGebra in the Teaching of Descriptive Geometry: Sections of Solids, *Mathematics* 10 (2022), 1 – 15. (SJR=0.54, Q2)
7. Escola, J., Lopes, N., Catarino, P., Aires, A.P., Portuguese Teachers' Conceptions of the use of Microsoft 365 during the COVID-19 Pandemic, *Computers*, 11 (2022), 1 – 21. (SJR=0.56, Q2)
8. Escola, J., Lopes, N., Catarino, P., Aires, A.P., Microsoft 365 as a tool for teaching during the COVID-19 pandemic: Perceptions of Portuguese teachers of Basic and Secondary Education, *Open Education Studies* 4 (2022), 241 – 251. (SJR=0.17 Q3)
9. Manguiera, M.C. dos S., Alves, F.R.V., Catarino, P., Os números híbridos de k-Leonardo, *Brazilian Electronic Journal of Mathematics* 3 (2022), 71 – 84.
10. Manguiera, M.C. dos S., Alves, F.R.V., Catarino, P., Hybrid Quaternions of Leonardo, *Trends in Computational and Applied Mathematics* 23 (2022), 51 – 62.

11. Manguiera, M.C. dos S., Vieira, R.P.M., Alves, F.R.V, Catarino, P., Hybrid quaternions of Pell and Jacobsthal, *HiGlobal Journal of Science Frontier Research: (F) Mathematics and Decision Sciences* 22 (2022).
12. Torres M.J., Generic behaviours of conservative systems, *CIM Bulletin*, 44 (2022), 19–26.
13. Vieira, R.P.M., Alves, F.R.V, Catarino, P., On the (s, t) - Padovan n - dimensional recurrences, *Bull. Int. Math. Virtual Inst.* 12 (2022), 387 – 395.