

CURRICULUM VITÆ

Name: José Luis Esteves dos Santos

Date of birth: April 2, 1972

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1 Education

- Ph.D. in Applied Mathematics, University of Coimbra, Portugal, 2003.
- M.S. in Optimization, University of Coimbra, Portugal, 1998.
- B.S. in Mathematics (and Operations Research), University of Coimbra, Portugal, 1995.

2 Positions

- Assistant Professor, Department of Mathematics, University of Coimbra, November 2003 – .
- Teaching Assistant, Department of Mathematics, University of Coimbra, November 1995 – November 2003.
- Monitor, Department of Mathematics, University of Coimbra, November 1993 – November 1995.

3 Awards

- APDIO–IO’98 Award, in *ex-aequo*, for the best doctoral thesis in Operations Research between 1996 and 1998.

4 Teaching

- Computacional Mathematics: computer science undergraduate program.
- Nonlinear Programming: math. undergraduate program.
- Linear Algebra: several engineering undergraduate programs.
- Numerical analysis: math. and several engineering undergraduate programs.
- Statistics: several engineering undergraduate programs.

5 Postdocs and Students Supervised

5.1 Master Students

- Paula Sousa, Numerical Approach for Optimal Control Problems, October 2007 – June 2008.
- Carlos Eduardo Vieira Caçador, Optimization in network transportation problems, October 2008 – June 2009.

6 Research

6.1 Research Interests

- Multi-objective optimization
- Combinatorial optimization.
- Numerical Approach for large linear systems.
- Numerical methods for nonlinear programming.
- Optimal control problems

6.2 Membership of Scientific Societies

- Associação Portuguesa para o Desenvolvimento da Investigação Operacional (APDIO).
- Sociedade Portuguesa de Matemática (SPM).

6.3 Refereeing

- Communications in Statistics - Theory and Methods.
- Computers & Industrial Engineering.
- European Journal of Operational Research.
- IEEE Transactions on Automation Science and Engineering.
- International Journal of Computer Mathematics.

- International Journal of Foundations of Computer Science.
- International Transactions in Operational Research.

6.4 Funding

- Member: In pursuit of increasingly accurate molecular potentials and dynamics (PTDC/QUI-QUI/099744/2008), 2008-2011, Science and Technology Portuguese Foundation, (PI: António Varandas).
- Member: MOSAL - Multi-objective Sequence Alignment (PTDC/EIA-CCO/098674/2008), 1999-2000, Science and Technology Portuguese Foundation, (PI: Luís Paquete).

6.5 Meetings

- Organizer of the session "Multicriteria Routing" under the stream "Multiple Objective Optimization and Decision Theory", EURO XXIII, Bonn, Germany, July 5-8, 2009. (chairman: José Santos).
- Organizer of the session "MOO: Algorithms for Multi-Objective Combinatorial Optimization II" under the stream "Multi-Objective Optimization", EURO XXIV, Lisbon, Portugal, July 11-14, 2010. (chairman: José Santos).
- Organizer of the session "Multicriteria Routing" under the cluster on "Multicriteria Analysis and Optimization", ALIO-INFORMS 2010 Joint International Meeting, Buenos Aires, Argentina, June 6-9, 2010. (co-organized with José Paixão, chairman: José Paixão)
- Member of the organizing committee of the Summer School and Workshop on Imaging Sciences and Medical Applications, June 15-23, 2010.

7 Presentations and Lectures

7.1 Presentations

- E.Q. Martins and J.L. Santos, *Computational experiments with a shortest paths ranking algorithm*, Optimization '95, Braga, 17 – 19, July, 1995.
- E.Q. Martins and J.L. Santos, *Transmissão de dados pelo trajecto mais rápido*, VII Congresso da APDIO, Aveiro, Portugal, 1 – 3, April, 1996.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, *Ranking paths in the multiobjective shortest path problem*, INFORMS / CORS Spring 1998 Joint Meeting, Montreal, Canada, 26 – 29, April, 1998.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, *A new algorithm for the multiobjective shortest path problem*, Optimization '98, Coimbra, 20 – 22, July, 1998.
- *Uma abordagem ao problema do trajecto óptimo multiobjectivo*, IO '98, Faro, November 29 – December 2, 1998.

- E.Q. Martins, M.M. Pascoal and J.L. Santos, *Ranking algorithms for the multiobjective shortest path problem* The 15th Triennial Conference of the IFORS, Beijing, China, 16 – 20, August, 1999.
- *Algoritmo de rotulação para o problema multiobjectivo do trajecto mais curto.* IO '2000, Setúbal, Portugal, 16 – 19, April, 2000.
- *Algoritmos baseados em técnicas de enumeração de trajectos para o problema do trajecto mais curto multiobjectivo.* IO '2000, Setúbal, Portugal, 16 – 19, April, 2000.
- J.P. Paixão M.S. Rosa and J.L. Santos, Optimization 2001, Aveiro, Portugal, 22 – 25, July, 2001. *The determination of the path with minimum cost norm value*
- E.Q. Martins, J.P. Paixão, M.S. Rosa and J.L. Santos, A New Algorithm Based on Ranking Paths Procedure for the Multiobjective Shortest Path Problem, TRISTAN V (The Fifth Triennial Symposium on Transportation Analysis), Le Gosier, Guadeloupe Î France, June 13-18, 2004.
- J.P. Paixão, M.S. Rosa and J.L. Santos, The Variability of the Number of Nondominated Paths, Optimization 2004, Lisbon Î Portugal, July 25-28, 2004. (speaker: J.L. Santos)
- J.L. Santos, J.P. Paixão, M.S. Rosa, A statistical analysis on the number of non-dominated paths in the multiobjective shortest path problem, International Network Optimization Conference, Lisbon Î Portugal, March 21-23, 2005.
- F. Patrício and J.L. Santos. A solution to the problem "On the Convergence of Second-Order Iterative Methods for Image Restoration". 3rd International Workshop on Mathematical Techniques and Problems in Telecommunications, Leiria, 4-8 September, 2006.
- J.L. Santos. K shortest path algorithms. The Ninth DIMACS Implementation Challenge: The Shortest Path Problem, DIMACS Center, New Jersey - USA, 13-14 November, 2006.
- J.L. Santos, J.P. Paixão, A new ranking algorithm for the multiobjective shortest path problem, EURO XXII 22st European Conference on Operational Research, Prague, July 8-11, 2007.
- A. Araújo, F. Patrício, J.L. Santos. Solução óptima de um problema de difusão com termo fonte discreto. Encontro Nacional da Sociedade Portuguesa de Matemática, Coimbra, Portugal, 25-28, July, 2008.
- A. Araújo, F. Patrício, J.L. Santos. Optimal Pumping in a Single Chamber Microbial Fuel Cell. International Conference on Renewable Energies and Power Quality (ICREPQ'08), Santander (Spain), 12-14 March 2008.

7.2 Contributed Talks

- E.Q. Martins, M.M. Pascoal and J.L. Santos, *O Problema dos K Caminhos Mais Curtos*, VII Congresso da APDIO, Aveiro, Portugal, 1 – 3, April, 1996.
- E.Q. Martins and J.L. Santos, *The K-th shortest path problem*, The 14th Triennial Conference of the IFORS, Vancouver, Canada, 8 – 12, July, 1996.

- M. Nour, E.Q. Martins, J. W. Atwood, M. Gendreau, M.M. Pascoal and J.L. Santos, *Simulation of Network Performance Based Connection Admission Control*, 2nd IFIP Workshop on Traffic Management and Synthesis of ATM Networks, Montreal, Canada, 24 – 26, September, 1997.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, *An Algorithm for Ranking Loopless Paths*, INFORMS / CORS SPRING 1998 JOINT MEETING, Montreal, Canada, 26 – 29, April, 1998.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, *Ranking Paths and Loopless Paths*, Optimization '98, Coimbra, Portugal, 20 – 22, July, 1998.
- E.Q. Martins, M.M. Pascoal, D.M. Rasteiro and J.L. Santos, *The Principle of Optimality in the Optimal Path Problem*, Optimization '98, Coimbra, Portugal, 20 – 22, July, 1998.
- *Uma abordagem ao problema do trajecto óptimo multiobjectivo*. IO '98, Faro, Portugal, November 29 – December 2, 1998.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, *Computational Experiments with K Shortest Paths Algorithms* The 15th Triennial Conference of the IFORS, Beijing, China, 16 – 20, August, 1999.
- M.E. Captivo, J.C. Clímaco, J.R. Figueira, E.Q. Martins and J.L. Santos, *A aplicação dos algoritmos de etiquetagem e de ordenação de caminhos na resolução de certos problemas combinatórios multicritério*. IO '2000, Setúbal, Portugal, 16 – 19, April, 2000.
- M.M. Pascoal and J.L. Santos, *Um novo melhoramento de um algoritmo para o problema dos K trajectos mais curtos*. IO '2000, Setúbal, Portugal, 16 – 19, April, 2000.
- D.M. Rasteiro and J.L. Santos, *Uma abordagem ao problema do trajecto óptimo estocástico*. IO '2000, Setúbal, Portugal, 16 – 19, April, 2000.
- E.Q. Martins and J.L. Santos, *The multiobjective shortest path problem – an overview*. IV Conference on Operations Research – Optimization, Statistics, Mathematical Economics and Algorithms, Havana, Cuba, 6-10, March, 2000.
- E.Q. Martins and J.L. Santos, *A comparative computational study of algorithms for the multiobjective shortest path problem*. IV Conference on Operations Research – Optimization, Statistics, Mathematical Economics and Algorithms, Havana, Cuba, March, 2000.
- E.Q. Martins, J.C. Clímaco, M.E. Captivo, J.R. Figueira and J.L. Santos, Optimization 2001, Aveiro, Portugal, 22 – 25, July, 2001. *On the Multiple Criteria 0,1 - Knapsack Problem - A New Generating Technique*.
- J.L. Santos, J.P. Paixão, M.S. Rosa, *A new label technique for the multiobjective shortest path problem*, EURO XXI 21st European Conference on Operational Research, Iceland, July 2-5, 2006.

8 Publications

8.1 Articles in Refereed Journals

- E.Q. Martins, M.M. Pascoal and J.L. Santos, An algorithm for the quickest path problem, *Operations Research Letters*, 20:195-198, 1997.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, Deviation algorithms for ranking shortest paths, *International Journal of Foundations of Computer Science*, 10, 3:247-261, 1999.
- E.Q. Martins, M.M. Pascoal and D.M. Rasteiro, J.L. Santos, The Optimal Path Problem, *Investigação Operacional*, 19:43-60, 1999.
- J.L. Santos, Uma abordagem ao problema do trajecto óptimo multiobjectivo (written in portuguese), *Investigação Operacional*, 19:211-226, 1999.
- E.Q. Martins and J.L. Santos, A new shortest paths ranking algorithm, *Investigação Operacional*, 20(1):47-61, 2000.
- E.Q. Martins, M.M. Pascoal and J.L. Santos, A new improvement for a K shortest paths algorithm, *Investigação Operacional*, 21(1):47-60, 2001.
- M.E. Captivo and J.N. Clímaco and J.R. Figueira and E.Q. Martins, Solving bicriteria 0-1 knapsack problems using a labeling algorithm, *Computers & Operations Research*, 30, 1865-1886, 2003.
- J.P. Paixão, E.Q. Martins, M.S. Rosa e J.L. Santos, The determination of the path with minimum cost norm value, *Networks*, 41(4):184-196, 2003.
- J.P. Paixão e M.S. Rosa e J.L. Santos. A statistical analysis on the number of non-dominated paths in the multiobjective shortest path problem. *Proc. of International Network Optimization Conference*, 2:595-602, 2005.
- Maria F. Patrício e J.L. Santos. A solution to the problem "On the Convergence of Second-Order Iterative Methods for Image Restoration". *Actas do 3rd International Workshop on Mathematical Techniques and Problems in Telecommunications*, 49-50, 2006.
- A. Araújo, Maria F. Patrício e J.L. Santos. Optimal pumping in a single chamber microbial fuel cell, *Renewable Energy & Power Quality Electronic Journal*, vol. on the Web site, No. 306, 2008.
- J.L. Santos. Real-World Applications of Shortest Path Algorithms. In C. Demetrescu, A.V. Goldberg, D. Johnson. *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, Vol 74, American Mathematical Society AMS, Providence, Rhode Island, 2009, pg 1-17.
- A. Araújo, M.F. Patrício, José L. Santos. Optimal solution of a diffusion equation with a discrete source term. *International Journal for Numerical Methods in Biomedical Engineering*, 26:1176-1187, 2010.

- J.P. Paixão, J.L. Santos. Labelling methods for the general case of the multiobjective shortest path problem - a computational study. To appear in the Proc. of ISCIES '2011, Springer, 2012.

8.2 Theses

- **J.L. Santos**, The multi-objective optimal path problem (written in portuguese), M.S. Thesis, University of Coimbra, 1997.
- **J.L. Santos**, Vektorial optimization in networks, Ph.D. Thesis, University of Coimbra, 2003.

8.3 Technical Reports and Other Papers

- E.Q. Martins, M. Rosa, J.P. Paixão, J.L. Santos. Ranking multiobjective shortest paths, Dep. Mathematics, Univrsity of Coimbra, Technical Report, 07-11, 2007.
- J.P. Paixão, J.L. Santos. A new ranking path algorithm for the multi-objective shortest path problem, Dep. Mathematics, Univrsity of Coimbra, Technical Report, 08-27, 2008.