Jan Harold Mercado Alcantara

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Research Interests

Nonlinear Optimization, Feasibility Problems, Variational Inequalities

Education

Doctor of Philosophy in Mathematics 02/2018 - 06/2020
National Taiwan Normal University
Dissertation: Dynamical Systems Approach to Complementarity Problems
Advisor: Prof. Jein-Shan Chen

Master of Science in Mathematics 05/2013 - 04/2015
De La Salle University

Bachelor of Secondary Education major in Mathematics 05/2009 - 09/2012
De La Salle University

Academic Experience

Postdoctoral Scholar 08/2021 - present
Institute of Statistical Science, Academia Sinica
Supervisor: Dr. Ching-pei Lee

Visiting Scholar 08/2022 - 10/2022
Department of Mathematics, National University of Singapore
Host collaborator: Prof. Kim-Chuan Toh

Postdoctoral Fellow 08/2020 - 07/2021
Department of Mathematics, National Taiwan Normal University
Supervisor: Prof. Jein-Shan Chen

Teaching Experience

Teaching Assistant (Advanced Linear Algebra) 09/2019 - 01/2020
Department of Mathematics, National Taiwan Normal University
Instructor: Prof. Chu-Chin Hu

Assistant Professor 01/2017 - 12/2017
Mathematics and Statistics Department, De La Salle University

Teaching Associate 01/2016 - 12/2016
Mathematics and Statistics Department, De La Salle University

Lecturer 08/2015 - 12/2015
Mathematics and Statistics Department, De La Salle University

Lecturer 06/2015 - 10/2015
Mathematics Department, Adamson University 11/2012 - 03/2013

• **Courses taught**
Graduate courses: Linear Algebra and Calculus
Undergraduate courses: Abstract Algebra, Differential Equations, Differential Calculus, Integral Calculus, Multivariable Calculus, Differential Equations, Algebra and Trigonometry

Publications

Articles

1. **Alcantara, Jan Harold** and Lee, Ching-pei, "Accelerated projected gradient algorithms for sparsity constrained optimization problems", accepted in *Advances in Neural Information Processing Systems (NeurIPS)* (2022).

2. **Alcantara, Jan Harold**, Chen, Jein-Shan, and Tam, Matthew K., "Method of alternating projections for the general absolute value equation", to appear in *Journal of Fixed Point Theory and Applications* (2022).

3. **Alcantara, Jan Harold** and Chen, Jein-Shan, "A new class of neural networks for NCPs using smooth perturbations of the natural residual function", *Journal of Computational and Applied Mathematics*, vol. 407, 114092 (2022).

4. Sun, Juhe, Fu, Weichen, **Alcantara, Jan Harold**, and Chen, Jein-Shan, "A neural network based on the metric projector for solving SOCCVI problem", *IEEE Transactions on Neural Networks and Learning Systems*, vol. 32, no. 7, pp. 2886–2900 (2021).

5. Wu, Caiying, Wang, Jing, **Alcantara, Jan Harold**, and Chen, Jein-Shan, "Smoothing strategy along with conjugate gradient algorithm for signal reconstruction", *Journal of Scientific Computing*, vol. 87, no. 1, Article 21 (2021).

6. **Alcantara, Jan Harold** and Chen, Jein-Shan, "A novel generalization of the natural residual function and a neural network approach for the NCP", *Neurocomputing*, vol. 413, pp. 368–382 (2020).

7. **Alcantara, Jan Harold**, Lee, Chen-Han, Nguyen, Chieu Thanh, Chang, Yu-Lin, and Chen, Jein-Shan, "On construction of new NCP functions", *Operations Research Letters*, vol. 48, pp. 115–121 (2020).

8. **Alcantara, Jan Harold** and Chen, Jein-Shan, "Neural networks based on three classes of NCP-functions for solving nonlinear complementarity problems", *Neurocomputing*, vol. 359, pp. 102–113 (2019).

9. **Alcantara, Jan Harold**, Lao, Angelyn, and Ruivivar, Leonor, "Stability analysis of the ODE model representation of amyloidogenic processing in Alzheimer's disease in the presence of SORLA", *Molecular BioSystems*, vol. 12, pp. 1468–1477 (2016).

Preprints

10. **Alcantara, Jan Harold** and Lee, Ching-pei, "Global convergence and acceleration of fixed point iterations of union upper semicontinuous operators: proximal algorithms, alternating and averaged nonconvex projections, and linear complementarity problems", arXiv:2202.10052, submitted to *Mathematics of Operations Research* (2022).

11. Nguyen, Chieu Thanh, **Alcantara, Jan Harold**, Okuno, Takayuki, Takeda, Akiko, and Chen, Jein-Shan, "Unified smoothing approach for best hyperparameter selection problem using a bilevel optimization strategy", arXiv:2110.12630, under major revisions for *Mathematical Programming* (2021).

In Preparation

12. Nguyen, Chieu Thanh, **Alcantara, Jan Harold**, Lu, Yue, and Chen, Jein-Shan, "Smoothing penalty method for second-order cone programming".

13. Nguyen, Chieu Thanh, Hao, Zijun, **Alcantara, Jan Harold**, and Chen, Jein-Shan, "A p-power penalty approach for solving second-order cone complementarity problems".

14. Nguyen, Chieu Thanh, Santos, Bernadette Louise, **Alcantara, Jan Harold**, and Chen, Jein-Shan, "Smoothing functions for nonsmooth regularizers".

15. Miao, Xin-He, **Alcantara, Jan Harold**, and Chen, Jein-Shan, "A Gauss-Seidel type method for solving $\ell_2 - \ell_p$ minimization"

16. **Alcantara, Jan Harold** and Chen, Jein-Shan, "An efficient and accurate solver for large-scale sparse recovery problems using a conjugate gradient algorithm for a class of smooth nonconvex regularizers".

Invited Talks

- "Global convergence and acceleration of fixed point iterations of union upper semicontinuous operators with applications to feasibility problems and optimization", SIAM Conference on Optimization, Seattle, USA, May 2023 (Scheduled).
- "Hyperparameter learning and sparse optimization: Theory and algorithms", Seminar (Online), RIKEN Center for Advanced Intelligence Project, Tokyo, Japan, October 2022.
- "Proximal algorithms for a class of nonconvex nonsmooth minimization problems involving piecewise smooth and min-weakly-convex functions", Invited Speaker for the Special Session of 2021 Taiwan Mathematical Society Annual Meeting, Taipei, Taiwan, January 2022.
- "Smooth nonconvex regularizers for sparse recovery problems and an efficient conjugate gradient algorithm", 2020 National Center for Theoretical Sciences Optimization Day for Young Researchers, National Taiwan Normal University, Taipei, Taiwan, December 2020.
- "Smoothed neural networks for nonlinear complementarity problems", Workshop on Advances in Continuous Optimization, University of Tokyo, Tokyo, Japan, September 2019.

Conference Talks

- "Method of alternating projections for solving absolute value equations", Contributed talk at the International Conference on Continuous Optimization, Pennsylvania, USA, July 2022.
- "Neural networks based on three classes of NCP-functions for solving nonlinear complementarity problems", Oral presentation delivered at Taiwan Mathematical Society Annual Meeting, Taipei, Taiwan, December 2018.
- "The dynamics of a breast cancer model with Raphanus sativus extract", Oral presentation delivered at the 2017 Mathematical Society of the Philippines Annual Convention, Legazpi City, Philippines, May 2017.
- "The dynamics of SORLA's influence on amyloidogenic processing", Oral presentation delivered at the 2016 Mathematical Society of the Philippines Annual Convention, Cebu City, Philippines, May 2016.
- "Stability Analysis of the ODE Model Representation of Amyloidogenic Processing in Alzheimer's Disease in the presence of SORLA", Oral presentation delivered at the 3rd Asian Regional Conference on Systems

Biology (ARCSB2015-TriSys), Selangor, Malaysia, September 2015.

Invited Lectures

- "Projection methods for feasibility problems", DLSU Mathematics and Statistics Lecture Series, De La Salle University, Manila, Philippines, August 2021.
- "Qualitative Analysis of Solutions and Introduction to Bifurcation", DLSU Mathematics Lecture Series, Manila, Philippines, 2017.
- "On Stability and Bifurcation Analysis", First Lecture Series for AY2016-2017, Mathematical Society of the Philippines – National Capital Region held at Mapua Institute of Technology 2016.
- "Mathematical Modelling of Dynamical Systems: Stability Analysis of ODE Models", DLSU Mathematics Lecture Series, Manila, Philippines, 2016.

Grants and Awards

- Participant, Global Young Scientists Summit (GYSS), 2023.
- Travel Grant for Young Scholars Attending International Conferences Abroad, Academia Sinica, 2022.
- Department of Science and Technology – Accelerated Science and Technology Human Resource Development Program (DOST-ASTHRDP) Scholarship, Department of Science and Technology – Science Education Institute, 2013-2015.
- St. La Salle Scholarship, De La Salle University, 2009-2012.

Professional Service

Reviewer:

- Journal of Applied Mathematics and Computing
- Journal of Computational and Applied Math
- Journal of Global Optimization
- Neural Computing and Applications
- Pacific Journal of Optimization
- Taiwanese Journal of Mathematics

References

Jein-Shan Chen, Ph.D.
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