

**Saeid Hajizadeh**

<b>CONTACT INFORMATION</b>	851 S. Morgan St. Department of Department of Mathematics, Statistics, and Computer Science University of Illinois at Chicago Chicago, IL 60607 Google Scholar : <a href="#">Google Scholar</a>	
<b>RESEARCH INTERESTS</b>	Nonconvex Minimax Optimization, Nonsmooth Optimization, Large-Scale Optimization, Machine Learning, and Application of Variational Analysis in Optimization	
<b>EDUCATION</b>	<p><b>The University of Illinois at Chicago</b>, Chicago, IL</p> <p>PhD, Mathematical Computer Science<span style="float:right">2017-2023</span> Advised by: <a href="#">Haihao (Sean) Lu</a> and <a href="#">Lev Reyzin</a> <b>The University of Illinois at Chicago</b>, Chicago, IL</p> <p>Masters of Science , Electrical and Computer Engineering,<span style="float:right">2016</span></p> <p><b>Ferdowsi University of Mashhad</b>, Mashhad, Iran</p> <p>B.Sc., Electrical Engineering,<span style="float:right">2011</span></p> <ul style="list-style-type: none"> <li>• Thesis Topic: <i>Broadcast Channels in Network Information Theory</i></li> <li>• Advisor: Ghosheh Abed Hodtani</li> </ul>	
<b>RESEARCH</b>	<p><b>The University of Chicago</b>, Chicago, IL</p> <p>Large-scale minimax optimization,<span style="float:right">2020-Present</span></p> <p>This is a multi-folded project with my advisor, Haihao Lu, in which we try to understand the reach of first-order methods in solving smooth nonconvex-nonconcave minimax problems. In the most recent result<sup>1</sup>, we proved the convergence of Extra-Gradient Method to a stationary point of nonconvex-nonconcave objective function when there is strong interaction between the two adversaries, i.e. the two variables the objective is being maximized upon.</p> <p>In the project I very recently started, we are looking at the question of how one can use first-order methods to efficiently solve linear programming when the scale is huge. In these problems, simplex and interior point method, which are considered in the class of second-order methods, will admit storage and computational issues in very large scale. First order primal-dual methods, for instance, only admit matrix-vector product which is efficient even in huge scales. On the other hand, first-order methods are easily distributed across various machines while classical LP methods solve linear systems of equations which are challenging to distribute across various systems and GPUs.</p> <p><b>The University of Illinois at Chicago</b>, Chicago, IL</p> <p>Information Theoretical limits of Communication on two-way channels,<span style="float:right">2013-2015</span></p> <p><b>Ferdowsi University of Mashhad</b>, Mashhad, Iran</p> <p>Undergraduate Research Student, Information Theory,<span style="float:right">2010-2012</span></p>	

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<sup>1</sup>This draft will be available on ArXiv very soon.

COURSEWORK	<ul style="list-style-type: none"> <li>• Fundamentals of Deep Learning</li> <li>• Numerical Optimization</li> <li>• Convex and Variational Analysis (self-taught; <a href="#">here</a> are my notes)</li> <li>• Real Analysis</li> <li>• Probability Theory</li> <li>• Point-set Topology</li> <li>• Market Microstructure and Electronic Trading</li> <li>• Quantitative Methods in Finance</li> <li>• Ordinary Differential Equations</li> <li>• Advanced Statistical Theory</li> <li>• Network Information Theory</li> <li>• Stochastic Process</li> <li>• Digital Signal Processing II</li> <li>• Advanced Digital Communications</li> <li>• Detection and Estimation Theory</li> </ul>
SELF-STUDY COURSEWORK	<ul style="list-style-type: none"> <li>• Statistical Learning <ul style="list-style-type: none"> <li>• <a href="#">Linear Regression Models with Some Examples in Finance</a></li> <li>• <a href="#">Logistic Regression, Linear Discriminant Analysis (LDA), Quadratic Discriminant Analysis (QDA), and <math>K</math>-Nearest Neighbor (KNN)</a></li> <li>• <a href="#">Non-linear Learning Methods</a></li> </ul> </li> <li>• Advanced Linear Algebra <ul style="list-style-type: none"> <li>• <a href="#">Linear Algebra brain-teasers I solved</a></li> </ul> </li> </ul>
HONORS AND AWARDS	Exceptional Undergraduate researcher, Ferdowsi University of Mashhad
PUBLICATIONS	<p>S. Hajizadeh, Haihao Lu, and Benjamin Grimmer, <i><b>On the Convergence a Variant of Extra-Gradient Method for Nonconvex-Nonconcave Minimax Problems</b></i>, In preparation</p> <p>S. Berenjian, S. Hajizadeh, R. Ebrahimi, <i><b>An Incentive Security Model to Provide Fairness for Peer-to-Peer Networks</b></i>, <i>IEEE Conference on Applications, Information and Network Security</i>, 19-21 Nov. 2019, Penang, Malaysia.</p> <p>M. Monemizadeh, H. Fehri, G. Abed Hodtani, S. Hajizadeh <i><b>Capacity Bounds and High-SNR Capacity of the Additive Exponential Noise Channel With Additive Exponential Interference</b></i>, <i>Iranian Journal of Electrical and Electronic Engineering</i>, Aug. 2019.</p> <p>S. Hajizadeh, N. Devroye <i><b>Dependence Balance Outer Bounds for the Discrete Memoryless Two-way Multiple Access Broadcast Channel</b></i>, <i>52<sup>nd</sup> Annual Allerton Conference on Communication, Control, and Computing</i>, Monticello, IL, Oct. 2014.</p> <p>S. Hajizadeh, M. Monemizadeh, and E. Bahmani <i><b>State-dependent Z Channels</b></i>, <i>48<sup>th</sup> Annual Conference on Information Sciences and Systems (CISS)</i>, Princeton University, March 19-21, 2014. More complete version available at <a href="#">ArXiv</a>.</p> <p>S. Hajizadeh, G. A. Hodtani <i><b>Three-receiver Broadcast Channels with Side Information</b></i>, <i>IEEE Int. Symp. on Inf. Theory</i>, Boston, MA, July 2012.</p> <p>S. Hajizadeh, G. A. Hodtani <i><b>Asymmetric Broadcast Channels</b></i>, <i>50<sup>th</sup> annual Allerton Conference on Communications, Control, and Computing</i>, Monticello, IL, Oct. 2012.</p>

S. Hajizadeh, M. Monemizadeh, G. A. Hodtani ***A Coding Theorem for the Discrete Memoryless Compound Multiple Access Channels with Common Message and Generalized Feedback***, 50<sup>th</sup> annual Allerton Conference on Communications, Control, and Computing, Monticello, IL, Oct. 2012.

M. Momenizadeh, S. Hajizadeh, G. A. Hodtani S. A. Seyedin ***Compound Multiple Access channel with Common Message and Intersymbol Interference***, International Symposium on Telecommunications (IST), Tehran, Iran, 2012.

M. Momenizadeh, S. Hajizadeh, G. A. Hodtani ***Capacity Bounds for Exponentially Dirty Paper***, submitted to *IEEE Wireless Communications Letters*, available online at [ArXiv](#).

S. Hajizadeh ***Broadcast Channels***, B.Sc. Thesis, September 2011, Ferdowsi University of Mashhad, Mashhad, Iran.

COMPUTER SKILLS

- Julia
- Python
- Matlab
- R
- C++ (less proficient)

HOBBIES AND PASTIME

- Listening to the U.S. Supreme Court Oral Arguments
- Reading about Antitrust Law
- Reading History (of U.S. Supreme Court and Japan, in particular)
- Listening to Podcasts (“The Zach Lowe” and “We The People” are my favorites)
- Watching Basketball
- Camping
- Cooking