서상협 (Seo, Sang-hyup)

부산광역시 중구 보수대로56번길 15 806호

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학력

이학박사, 부산대학교 **2012.03 – 2019.02**

◦ 졸업논문 : Accelerations of Newton's Methods Solving Nonlinear Matrix Equations

이학석사, 부산대학교 **2010.03 – 2012.02**

◦ 졸업논문 : The Numerical Method for Solving a Quadratic Matrix Equation with Special Coefficient Matrices

경력사항

(주)스마트소셜 **2023.02 –**

◦ 선임연구원 / 팀장

국가수리과학연구소 **2019.10 – 2022.09**

◦ 박사후연구원

부산대학교 **2019.03 – 2019.09**

◦ 박사후연구원

(주)스마트소셜 **2017.03 – 2017.10**

◦ 사원 : 데이터베이스 분석, 상품 및 과제 기획

연구실적

논문

2013 Seo, Sang-Hyup, Seo, Jong-Hyun, and Kim, Hyun-Min, "Newton's Method for Solving a Quadratic Matrix Equation with Special Coefficient Matrices", *Honam Math. J.*, 35(3), 417–433, Sep. 2013.

2018 Meng, J., Seo, S. & Kim, H. "Condition Numbers and Backward Error of a Matrix Polynomial Equation Arising in Stochastic Models", *J. Sci. Comput.* 76, 759–776 (2018).

2018 Seo, Sang-Hyup, Seo, Jong-Hyeon, and Kim, Hyun-Min, "A Modified Newton Method for a Matrix Polynomial Equation Arising in Stochastic Problem", *Electron. J. Linear Algebra*, 34, 500–513, 2018.

2019 Kim, Taehyeong, Sang-Hyup Seo, and Hyun-Min Kim. "On Newton's Method for Solving a System of Nonlinear Matrix Equations." *East Asian Math. J.* 35(3), 341–349, 2019.

2020 Seo, Sang-hyup, and Jong-Hyeon Seo. "Convergence of relaxed Newton method for order-convex matrix equations", *Comput. Appl. Math.* 39(1), 1–17, 2020.

2023 Na Hyeon Lee, Seon Hee Kim, Sang-Hyup Seo, Byeong-Jun Kim, Chi-Seung Lee, Gil Hwan Kim, Sung Jin Park, Seon Hyun Kim, Dong Yeon Ryu, Ho Hyun Kim, Sang Bong Lee, Chan Ik Park, and Jae Hun Kim, "Prediction of respiratory complications by quantifying lung contusion volume using chest computed tomography in patients with chest trauma", *Sci Rep.* 13(1):6387, Apr 2023.

2023 Giphil Cho, Young Jin Kim, Sang-hyup Seo, Geunsoo Jang, and Hyojung Lee, "Cost-effectiveness analysis of COVID-19 variants effects in an age-structured model", *Sci Rep.* 13: 15844, 2023.

과제참여

산업수학 문제해결 연구 (참여연구원)
- 사업비 : ₩5,947,000,000
- 기간 : 2019.10 – 2022.09
- 기관고유사업

안과질환 진단서비스 플랫폼 개발사업 (참여연구원)
- 사업비 : ₩98,000,000
- 기간 : 2019.05 – 2020.12
- 지원기관 : 부산광역시

부산광역시 의료수학 생태계 조성사업 (참여연구원)
◦ 사업비 : ₩320,000,000
◦ 기간 : 2020.01 – 2022.09
◦ 지원기관 : 부산광역시

아프리카 돼지열병 발생시 효과적인 차단 방역지대 설정 연구 (참여연구원)
◦ 사업비 : ₩225,000,000
◦ 기간 : 2020.04 – 2021.12
◦ 지원기관 : 농림축산식품부

데이터 기반 감염병 유행 예측 수리모델 개발과 완화전략 분석 (참여연구원)
◦ 사업비 : ₩201,398,000
◦ 기간 : 2021.09 – 2022.09
◦ 지원기관 : 한국연구재단

탄소중립 대응 친환경 섬유소재 개발 디지털 전환 인공지능 플랫폼 구축 (참여연구원)
◦ 사업비 : ₩100,000,000
◦ 기간 : 2022.07 – 2022.09
◦ 지원기관 : 한국산업기술진흥원

발표실적

- "Ophthalmic Disease Diagnosis Based on Convolutional Neural Network", *KSIAM 2020 Annual Meeting*, KAL Hotel in Jeju, Korea, Nov. 12–15, 2020.
- "Convergence of a Modified Newton Method for a Matrix Polynomial Equation Arising in Stochastic Problems", *Numerical Analysis and Scientific Computation with Applications 2018*, Elite City Resort in Kalamata, Greece, Jul. 2–6, 2018.
- "Convergence of Newton Iterations for Order-Convex Matrix Functions", *SIAM Conference on Applied Linear Algebra*, Hyatt Regency Atlanta, USA, Oct. 26-30, 2015.
- "The Existence and Convergence of Two Iterations for Differentiable Order-Convex Matrix Functions", *The 2014 International Conference on Tensors and Matrices and their Applications*, Suzhou, China, Dec. 16–19, 2014.

- "The Newton and the Fixed Point Iterations for Differentiable Order-Convex Matrix Functions", *International Linear Algebra Society Conference 2014*, Sungkyunkwan University, Korea, Aug. 6–9, 2014.
- "The Monotone Convergence of Newton's Method for Differentiable Convex Matrix Functions", *Hakata Workshop 2014*, Kyushu, Japan, Feb. 8, 2014.
- "The Elementwise Convex Condition for Differentiable Matrix Functions", *AKOOS-PNU*, Pusan National University, Korea, Feb. 5–7, 2014.
- "Newton's method for solving a quadratic matrix equation with special coefficient matrices", *KOOK-TAPU Joint Seminar 2013*, Osaka City University, Japan, Jul. 22–26, 2013.

포스터 발표

- "Properties of Nonnegative, Irreducible, and M-Matrices", *The Asian Mathematical Conference 2013*, BEXCO, Korea, Jun. 30–Jul. 4, 2013.

Seo, Sang-hyup (서상협)

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Mobile : 010-4545-9199

E-mail: saibie1677@gmail.com

Education

Ph. D., Pusan National University **2012.03 – 2019.02**

○ Thesis : Accelerations of Newton's Methods Solving Nonlinear Matrix Equations

MS., Pusan National University **2010.03 – 2012.02**

○ Thesis : The Numerical Method for Solving a Quadratic Matrix Equation with Special Coefficient Matrices

Career

Smart Social, Inc. **2023.02 –**

○ Senior Researcher

National Institute for Mathematical Sciences **2019.10 – 2022.09**

○ Post Doctor

Pusan National University **2019.03 – 2019.09**

○ Post Doctor

Smart Social, Inc. **2017.03 – 2017.10**

○ Staff : Analysis for Database, Product and Project Planning

Publications

Papers

2013 Seo, Sang-Hyup, Seo, Jong-Hyun, and Kim, Hyun-Min, "Newton's Method for Solving a Quadratic Matrix Equation with Special Coefficient Matrices", *Honam Math. J.*, 35(3), 417–433, Sep. 2013.

2018 Meng, J., Seo, S. & Kim, H. "Condition Numbers and Backward Error of a Matrix Polynomial Equation Arising in Stochastic Models", *J. Sci. Comput.* 76, 759–776 (2018).

2018 Seo, Sang-Hyup, Seo, Jong-Hyeon, and Kim, Hyun-Min, "A Modified Newton Method for a Matrix Polynomial Equation Arising in Stochastic Problem", *Electron. J. Linear Algebra*, 34, 500–513, 2018.

2019 Kim, Taehyeong, Sang-Hyup Seo, and Hyun-Min Kim. "On Newton's Method for Solving a System of Nonlinear Matrix Equations." *East Asian Math. J.* 35(3), 341–349, 2019.

2020 Seo, Sang-hyup, and Jong-Hyeon Seo. "Convergence of relaxed Newton method for order-convex matrix equations", *Comput. Appl. Math.* 39(1), 1–17, 2020.

2023 Na Hyeon Lee, Seon Hee Kim, Sang-Hyup Seo, Byeong-Jun Kim, Chi-Seung Lee, Gil Hwan Kim, Sung Jin Park, Seon Hyun Kim, Dong Yeon Ryu, Ho Hyun Kim, Sang Bong Lee, Chan Ik Park, and Jae Hun Kim, "Prediction of respiratory complications by quantifying lung contusion volume using chest computed tomography in patients with chest trauma", *Sci Rep.* 13(1):6387, Apr 2023.

2023 Giphil Cho, Young Jin Kim, Sang-hyup Seo, Geunsoo Jang, and Hyojung Lee, "Cost-effectiveness analysis of COVID-19 variants effects in an age-structured model", *Sci Rep.* 13: 15844, 2023.

Projects

Research on solving problems of industrial mathematics (Co-investigator)
- Fund : $5,947,000
- Period : 2019.10 – 2022.09
- Support : National Institute for Mathematical Sciences

Development of a Service Platform for Ophthalmology Disease Diagnosis (Co-investigator)
- Fund : $98,000
- Period : 2019.05 – 2020.12
- Support : Busan Metropolitan City

Ecosystem grant for medical and industrial mathematics in Busan (Co-investigator)
◦ Fund : $320,000
◦ Period : 2020.01 – 2022.09
◦ Support : Busan Economic Promotion Agency

Study on establishing effective blocking zones for the spread of Africa swine fever (Co-investigator)
◦ Fund : $225,000
◦ Period : 2020.04 – 2021.12
◦ Support : Ministry of Agriculture, Food and Rural Affairs

Development of mathematical model for data-based infectious disease outbreak prediction and mitigation strategy analysis (Co-investigator)
◦ Fund : $201,398
◦ Period : 2021.09 – 2022.09
◦ Support : National Research Foundation of Korea

AI platform establishment of eco-friendly textile material development digital conversion for Carbon-neutral (Co-investigator)
◦ Fund : $100,000
◦ Period : 2022.07 – 2022.09
◦ Support : Korea Institute for Advancement of Technology

Presentations

- "Ophthalmic Disease Diagnosis Based on Convolutional Neural Network", *KSIAM 2020 Annual Meeting*, KAL Hotel in Jeju, Korea, Nov. 12–15, 2020.
- "Convergence of a Modified Newton Method for a Matrix Polynomial Equation Arising in Stochastic Problems", *Numerical Analysis and Scientific Computation with Applications 2018*, Elite City Resort in Kalamata, Greece, Jul. 2–6, 2018.
- "Convergence of Newton Iterations for Order-Convex Matrix Functions", *SIAM Conference on Applied Linear Algebra*, Hyatt Regency Atlanta, USA, Oct. 26-30, 2015.

- "The Existence and Convergence of Two Iterations for Differentiable Order-Convex Matrix Functions", *The 2014 International Conference on Tensors and Matrices and their Applications*, Suzhou, China, Dec. 16–19, 2014.
- "The Newton and the Fixed Point Iterations for Differentiable Order-Convex Matrix Functions", *International Linear Algebra Society Conference 2014*, Sungkyunkwan University, Korea, Aug. 6–9, 2014.
- "The Monotone Convergence of Newton's Method for Differentiable Convex Matrix Functions", *Hakata Workshop 2014*, Kyushu, Japan, Feb. 8, 2014.
- "The Elementwise Convex Condition for Differentiable Matrix Functions", *AKOOS-PNU*, Pusan National University, Korea, Feb. 5–7, 2014.
- "Newton's method for solving a quadratic matrix equation with special coefficient matrices", *KOOK-TAPU Joint Seminar 2013*, Osaka City University, Japan, Jul. 22–26, 2013.

Poster Presentations

- "Properties of Nonnegative, Irreducible, and M-Matrices", *The Asian Mathematical Conference 2013*, BEXCO, Korea, Jun. 30–Jul. 4, 2013.