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THE SPECIAL ISSUE TO HONOR 90TH BIRTHDAY PROFESSOR SEHIE PARK

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The aim of this special issue is to honor Sehie Park, a distinguished scientist who made significant contributions to fixed point theory, on the occasion of his 90th birthday.

Fixed point theory is a fundamental and vibrant area of mathematics with deep theoretical roots and wide-ranging applications across disciplines. Its importance stems from its ability to unify concepts from analysis, topology, geometry, and algebra, while providing powerful tools for solving equations, modeling real-world systems, and designing algorithms. Fixed points are deeply embedded in the structure of mathematical objects, making them essential in understanding mappings and transformations. In economics and game theory, fixed point theorems such as Kakutani's and Brouwer's are instrumental in proving the existence of Nash equilibria–where each player's strategy is optimal given the strategies of others–as well as equilibrium prices in general economic models. In physics and dynamical systems, fixed points represent stable states, such as mechanical equilibria or steady-state solutions in differential equations, and play a crucial role in renormalization group theory, where they describe universal behavior during phase transitions and critical phenomena. In computer science and logic, fixed points underpin the semantics of programming languages by modeling recursive definitions and loop invariants through domain theory and Scott continuity; they also appear in automata theory and formal verification via fixed-point logics that express properties of transition systems. In optimization and machine learning, iterative methods like gradient descent and Newton's method converge to fixed points of operators derived from objective functions, while training neural networks can be interpreted as finding fixed points of nonlinear mappings. Moreover, many boundary value problems, integral equations, and partial differential equations are naturally reformulated as fixed point problems, enabling the application of topological and metric fixed point techniques to establish existence and uniqueness results. From a computational perspective, fixed point iterations form the foundation of numerous numerical algorithms, including Picard iteration for ordinary differential equations, Krasnoselskii-Mann iteration in convex optimization, and proximal algorithms for non-smooth optimization. In artificial intelligence, reinforcement learning algorithms such as value iteration and policy iteration converge to fixed points of Bellman operators, while generative adversarial networks (GANs) rely on Nash equilibria–minimax fixed points–between generator and discriminator networks. This broad applicability makes fixed point theory not only a cornerstone of pure mathematics but also an indispensable tool in applied sciences and engineering.

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Professor Sehie Park is one of the outstanding researchers of metric fixed-point theory. He is also a towering figure in the field of nonlinear functional analysis, particularly in fixed-point theory, KKM theory, and related areas. His scholarly contributions span several decades and have significantly shaped the development of modern fixed-point theory and its applications in mathematics and economics.

His pioneering work on multi-valued maps , abstract convex spaces , and generalized KKM theory has laid the foundation for numerous subsequent studies and has inspired generations of mathematicians around the world. Through his meticulous research and leadership, he has elevated the mathematical community not only in Korea but also internationally.

In Turkey, we have a beautiful cultural metaphor: "The Great Sycamore (Plane Tree)" . This refers to a majestic tree that stands tall and proud, offering shade and shelter for generations – a symbol of wisdom, endurance, and generosity. In the landscape of fixed point theory, Professor Park is precisely this kind of figure .

If we call Professor Sehie Park the "Great Sycamore of Fixed Point Theory" , we are not merely using poetic language – we are honoring a scholar whose work has provided shelter and inspiration to countless researchers worldwide, just as the Plane Tree gives shade to those who rest beneath it.

Throughout his career, he has authored hundreds of research articles and contributed to the theoretical underpinnings of various fixed point theorems, coincidence theorems, and equilibrium problems. His influence extends beyond his publications – through editorial leadership, mentorship, and service to the global mathematical community.

Like the Plane Tree that grows strong roots and spreads wide branches, Professor Park's work continues to grow in impact and reach, touching many disciplines and fostering new growth in applied mathematics, optimization, and economic equilibrium theory.

We salute Professor Sehie Park – not only as a distinguished academician and leader in his field – but as a living legacy in the world of mathematics, a true Great Sycamore whose shade continues to nourish the next generation of scholars.

Ankara, May 2025.

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