2025 Optimization Symposium

Department of Mathematics
National Taiwan Normal University

December 26, 2025

Sponsored by

College of Science, National Taiwan Normal University
Department of Mathematics, National Taiwan Normal University

Organized by

Jein-Shan Chen

Table 1: Schedule on December 26, 2025. Place: M212, Mathematics Department Building

	Speaker	Title	Chair
13:30 | 13:55	Pham Ngoc Anh	Viscosity inexact projection methods with applications to electricity production models	Jein-Shan Chen
13:55 | 14:20	Tran Van Thang	Weak convergence of inertial proximal algorithms with self adaptive stepsize for solving multivalued variational inequalities	Jein-Shan Chen
14:20 | 14:45	Ho Phi Tu	New viscosity-projection methods for solving variational inquality problems with applications to image restoration problems	Jein-Shan Chen
14:45 | 15:00	*Tea Break*		
15:00 | 15:25	Wei-Shih Du	New existence results for functionals with adjustability quasiconvexity and their applications in eigenvector problem and fixed point theory	Yu-Lin Chang
15:25 | 15:50	Le Van Ngoc	Robustness of exponential stability of a class of switched positive linear systems with time delays	Yu-Lin Chang
15:50 | 16:15	Shunsuke Kajiba	The shrinking projection method with allowable ranges for zero point problems and its applications	Yu-Lin Chang
16:15 | 16:30	*Tea Break*		
16:30 | 17:20	Vo Minh Tam	Analysis of Vector Equilibrium Problems with Partial Orders Induced by Certain Classes of Cones	Wei-Shih Du
17:20 | 17:30	*Free Discussion*		

Viscosity inexact projection methods with applications to electricity production models

P.N. Anh*

Abstract. Consider in a real Hilbert space $\mathcal{H}$. Let C be a nonempty, convex and closed subset of $\mathcal{H}$, $\mathcal{F} : C \to 2^{\mathcal{H}}$ is a cost multivalued mapping. The *variational inequality problem*, shortly VIP$(C, \mathcal{F})$, is formulated as the follows:

$$\text{Find } x^* \in C, w^* \in \mathcal{F}(x^*) \text{ such that } \langle w^*, x - x^* \rangle \geq 0, \quad \forall x \in C.$$

In this talk, we present a new inexact projection approach for the problem VIP$(C, \mathcal{F})$ without using inertial technique in a real Hilbert space. First, we introduce a new inxact projection and show some its prop- erties. By combining the inexact projection, viscosity technique and Mann-type iteration method via self-adaptive step size, we introduce a new VIP-Viscosity Inexact Projection Algorithm and prove its strong convergence under Lipschitz continuous and pseudomonotone assumptions of the cost multivalued mapping. Next, we apply the algorithm VIP to propose a new algorithm for the electricity production models. The effectiveness of the algorithm VIP is then validated by numerical experiments via computational examples of the electricity production models.

References

N.D. Hien, J.-S. Chen, N.V. Hong, P.N. Anh: Viscosity inexact projection methods with applications to electricity production models. *Communications in Nonlinear Science and Numerical Simulation*. Doi: 10.1016/j.cnsns.2025. 109471, 2025

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Weak convergence of inertial proximal algorithms with self adaptive stepsize for solving multivalued variational inequalities

T.V. Thang[1], **N.D. Hien**[2], **H.T.C. Thach**[3], **and P.N. Anh**[4]

In this talk, I present inertial proximal point-type algorithms for solving multivalued variational inequality problems in real Hilbert spaces. These algorithms are designed based on the proximal point method with the self-adaptive and inertial techniques. Convergence results are established under mild assumptions, and we further present the nonasymptotic $O(\frac{1}{k})$ convergence rate of the proposed algorithms.

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New viscosity-projection methods for solving variational inquality problems with applications to image restoration problems

C. T. T. Trang [1], H. P. Tu[2], and P. N. Anh[3]

Abstract: This research investigates two new viscosity-projection methods for solving variational inquality problems ($VIPs$) with applications to image restoration problems via approximation projection in a real Hilbert space. We design the viscosity Mann-type iteration progress accelerated approximation projection rule to solve the pseudomonotone $VIPs$. Then, we present two strongly convergent algorithms that can be easily implemented, as examples for solving image restoration problems. Numerical experiments illustrate and compare the performances of the proposed algorithms with three other well-known algorithms.

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New existence results for functionals with adjustability quasiconvexity and their applications in eigenvector problem and fixed point theory

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Abstract

In this talk, we establish new minimization theorems of functionals with adjustability quasiconvexity in the setting of normed linear spaces. As applications, we obtain new fixed point theorems and new existence theorems for root-finding problem and eigenvector problem.

Robustness of exponential stability of a class of switched positive linear systems with time delays

L. V. Ngoc

Abstract:

In this talk, we study the the robustness of exponential stability of a class of positive switched systems described by linear functional differential equations (FDE) under arbitrary switching or average dwell time switching. We will measure the stability robustness of such a system (which is considered as a nominal system) subject to parameter affine perturbations of its constituent subsystems matrices, by introducing the notion of structured stability radius. Some formulas for computing this radius, as well as estimating its lower bounds and upper bounds, are established. The extension of the obtained results to non-positive systems and the class of multi-perturbations has been presented. Examples are given to illustrate the proposed method.

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THE THRINKING PROJECTION METHOD WITH ALLOWABLE RANGES FOR ZERO POINT PROBLEMS AND ITS APPLICATIONS

SHUNSUKE KAJIBA

Abstract

In 2008, Takahashi, Takeuchi and Kubota [3] introduced the shrinking projection method which is an iterative method for finding a common fixed point of some families of nonlinear mappings in a Hilbert space. In the shrinking projection method, we need to obtain the exact value of the metric projection to generate a sequence in every step, and it is a task of difficulty. To solve this problem, in 2012, Kimura [1] presented the shrinking projection method with nonsummable errors in a geodesic space. Motivated by Kimura [1], in 2019, Takeuchi [2] proposed another method which is called the shrinking projection method with allowable ranges.

In this talk, we study the shrinking projection method with allowable ranges introduced by Takeuchi [2] for the zero point problem. We obtain strong convergence theorems for finding a zero point of a maximal monotone operator in a Banach space. Moreover, using our results, we discuss the convex minimization problem.

References

1. Y. Kimura, *Approximation of a fixed point of nonexpansive mapping with nonsummable errors in a geodesic space*, Proceedings of the 10th International Conference on Fixed Point Theory and Its Applications, 2012, pp. 157–164.
2. Y. Takeuchi, *Shrinking projection method with allowable ranges*, J. Nonlinear Anal. Optim., **10**(2019), 83–94.
3. W. Takahashi, Y Takeuchi and R. Kubota, *Strong convergence theorems by hybrid methods for families of nonexpansive mappings in Hilbert spaces*, J. Math. Anal. Appl., **341** (2008), 276–286.

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Analysis of Vector Equilibrium Problems with Partial Orders Induced by Certain Classes of Cones

Vo Minh Tam[1]

Abstract: The proposed PhD thesis, entitled "Analysis of Vector Equilibrium Problems with Partial Orders Induced by Certain Classes of Cones", aims to develop a systematic framework for vector equilibrium problems ordered by cone-induced partial orders, with particular emphasis on polyhedral cones and p-order type structures. The research focuses on establishing the existence and qualitative properties of solutions, and on deriving error bounds that explicitly exploit the geometry of these structured cones. In addition, the thesis will investigate suitable dynamical approaches, such as differential and neurodynamic systems, whose trajectories converge to solutions of the target problems in a manner consistent with the underlying cone-induced orders. A further objective is to extend and refine directional well-posedness concepts in the setting of vector equilibrium problems, thereby clarifying directional stability and robustness properties of solutions. Overall, the expected contributions are both theoretical, in terms of new results and unifying perspectives, and methodological, through analytical tools that can be applied to models in optimization and network equilibrium.

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