



Einladung zur öffentlichen Defensio

Buris TONGNOI

Thema der Dissertation

Extrapolation from the past in Tseng's algorithm for monotone inclusion problems and applications

Abstract:

The thesis is devoted to the solving of monotone inclusion problems involving composite structure and particular cases, i.e., the zero of the sum of monotone operators, minimax problems, convex optimization problems and variational inequality problems. The main focus throughout this manuscript is to investigate Tseng's forward-backward-forward algorithm with extrapolation from the past in various aspects.

One is the generalization of Tseng's forward-backward-forward algorithm endowed with variable metrics and error terms, and its primal-dual splitting algorithms for solving monotone inclusion problems and convex optimization problems. In addition, the image deblurring shows the application of the proposed algorithm. This exploration can be found in Chapter 3 and the detail of the work is published in Numerical Functional Analysis and Optimization in 2022.

Next, in Chapter 4, Tseng's forward-backward-forward algorithm with extrapolation from the past is considered in the penalty scheme for solving the monotone inclusion problem in terms of the sum of three operators. The weak (ergodic) convergence is obtained under some hypothesis related to the Fitzpatrick function, and the chapter consists of applications in minimax problems, problems involving the composition of linear continuous operators, and convex minimization problems. The numerical experiment is also demonstrated by applying the algorithm to TV-based image inpainting. The task is published in Numerical Algorithms in 2024.

Finally, in Chapter 5, Tseng's forward-backward-forward algorithm with extrapolation from the past is investigated for pseudo-monotone variational inequalities. The chapter contains the convergent result, and an adaptive stepsize strategy of the proposed method is also contributed. The effectiveness of the proposed algorithms is demonstrated through

numerical experiments in finite and infinite dimensional spaces. This phase of the study is based on a work which was published in Taiwanese Journal of Mathematics in 2024.

This academic work provides flexible tools based on Tseng's forward-backward-forward algorithm with extrapolation from the past for solving monotone inclusion problems in several contexts and their applications. Furthermore, it justifies the performance of Tseng's forward-backward-forward algorithm with extrapolation from the past over the classical Tseng method in some practical real-world problems.

Prüfungssenat

Univ.-Prof. Mag. Dr. Andreas Cap
(Vorsitz, Universität Wien)

Dr. Ernő Robert Csetnek, Privatdoz. MSc
(Universität Wien)

Prof. Dr. Francisco J. Aragón Artacho
(Universidad de Alicante)

Prof. Dr. Samir Adly
(Université de Limoges)

Zeit und Ort

Donnerstag, 12. Juni 2025, 15:00 Uhr

Online:

<https://univienne.zoom.us/j/64908139946?pwd=eYu0MgkwWfHkj21GciFvKaE7wkw4so.1>

Meeting ID: 649 0813 9946

Kenncode: 479324