SUMMARY OF DOCTORAL THESIS

The author's name: Nguyen Duc Truong

Thesis title: Some methods for solving variational inequality problems over fixed point sets

Scientific branch of the thesis: Mathematics

Major: Mathematical analysisCode: 946 01 01

The name of postgraduate training institution: Hanoi Pedagogical University N2

1. Thesis purpose and objectives

Thesis purpose:

- Study of algorithms for solving the variational inequality problems over fixed point sets, proving the strong convergence of sequential sequences in the algorithms to the unique solution of the problems.

- Illustrate the convergence by numerical experiments on Matlab software. Evaluate and compare the convergence speed on computer of the proposed algorithm with other popular algorithms.

Objectives:

- Study of variational inequality problems on fixed point sets and over the intersection of fixed point sets with solution sets of other variational inequality problems in real Hilbert spaces.

2. Research methods

- Using basic techniques in Analysis, Convex Analysis, Multivalued Analysis and Nonlinear Analysis,...

- Using methods in optimization problems, variational inequality problems such as projection method, subgradient method, viscosity approximation method, inertial technique, parallel computing technique, relaxed projection technique, etc.

3. Major results and conclusions

3.1. The major results

- Propose and prove the convergence of the hybrid inertial contraction algorithm to solve the variational inequality problem over the fixed point set of demi-contractive mapping sequence.

- Propose and prove the convergence of the inertial parallel approximation algorithm to solve the variational inequality problem over the fixed point set of demicontractive and demiclose maps. Apply the algorithm to the image processing model. - Propose and prove convergence for the relaxed projection algorithm, solving the variational inequality problem over a set of fixed points intersecting with the solution set of another variational inequality problem.

- Propose and prove the convergence of the projection contraction algorithm to solve the variational inequality problem on the fixed point set of the solution mapping for another variational inequality problem.

- The thesis is written in 3 chapters, the main results are based on 04 articles published in prestigious international scientific journals: 03 articles in SCIE journal ranked Q2, 01 article in Scopus journal ranked Q3.

3.2. Conclusions

- The thesis proposed and proved the convergence of 4 new algorithms to solve the variational inequality problem on a set of fixed points or the intersection of a set of fixed points with a set of solutions to another variational inequality problem.

- The effectiveness of the algorithms is demonstrated through numerical examples, evaluation, and comparison with other popular algorithms.

On behalf of academic supervisors

PhD. Student

Nguyen Duc Truong