

## **SUMMARY OF PHD DISSERTATION**

Dissertation Title: Some Contributions to the Theory of Generalized Polyhedral Optimization Problems

Speciality: Applied Mathematics                      Speciality code: 9 46 01 12

PhD student: Nguyen Ngoc Luan

Supervisor: Prof. Dr.Sc. Nguyen Dong Yen

Training Institute: Institute of Mathematics, Vietnam Academy of Science and Technology

This dissertation focuses on linear vector optimization problems and several related nonlinear scalar optimization problems, as well as nonlinear vector optimization problems. Namely, apart from linear vector optimization problems in locally convex Hausdorff topological vector spaces, which are the main subjects of our research, we study polyhedral convex optimization problems and piecewise linear vector optimization problems.

The fundamental concepts used in this thesis are polyhedral convex set and polyhedral convex function on locally convex Hausdorff topological vector spaces. About one half of the thesis is devoted to these concepts. Another half of the thesis shows how our new results on polyhedral convex sets and polyhedral convex functions can be applied to scalar optimization problems and vector optimization problems.

The main results of the thesis include:

- 1) A representation formula for generalized polyhedral convex sets and polyhedral convex sets in locally convex Hausdorff topological vector spaces.
- 2) A number of basic properties of generalized polyhedral convex sets in locally convex Hausdorff topological vector spaces.
- 3) Fundamental properties of generalized polyhedral convex functions on locally convex Hausdorff topological vector spaces.
- 4) Various properties of normal cones and polars of generalized polyhedral convex sets, conjugates of generalized polyhedral convex functions, and subdifferentials of generalized polyhedral convex functions.
- 5) Solution existence theorems, necessary and sufficient optimality conditions, weak and strong duality theorems for generalized polyhedral convex optimization problems in locally convex Hausdorff topological vector spaces.
- 6) Several theorems describing the structures of the efficient and weakly efficient solutions sets of linear and piecewise linear vector optimization problems.

Supervisor

*August 08, 2019*

PhD student

**Prof. Dr.Sc. Nguyen Dong Yen**

**Nguyen Ngoc Luan**