

Binh Dinh, February 27th, 2024

INFORMATION
ON THE NEW CONTRIBUTIONS OF DOCTORAL THESIS
(Information will be posted on the Website)

Title: ***Simultaneous diagonalizations of matrices and applications for some classes of optimization***

Speciality: Algebra and Number Theory Code No.: 9460104

PhD student: Thi Ngan Nguyen Course: 8

Advisors: 1. Advisor 1: Dr. Thanh-Hieu Le, Quy Nhon University;
 2. Advisor 2: Prof. Ruey-Lin Sheu, National Cheng Kung University,
Taiwan.

Training institution: **Quy Nhon University**

NEW CONTRIBUTIONS OF THE THESIS

1. Completely solving the problem of simultaneous diagonalization via congruence (SDC) of Hermitian matrices, on both theoretical and practical aspects, by formulating the SDC problem as a semidefinite program (SDP). Specially, the SDC results of Hermitian matrices also hold for the real symmetric matrices. Specifically,

a) Providing some necessary and sufficient SDC conditions for Hermitian matrices via an SDP;

b) The proposing algorithm with polynomial complexity for solving the SDC problem of a finite collection of Hermitian matrices; illustrating the results by numerical experiments in MALAB;

2. Giving an alternative method, which is inductive and constructive, for solving the SDC problem of a finite collection of real symmetric matrices;


3. Applying the SDC results for completely computing the positive semidefinite interval of matrix pencil, which is then applied for

a) solving the generalized trust region subproblems: GTRS;

b) solving the quadratically constrained quadratic programming;

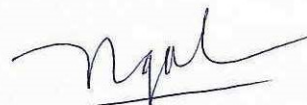
c) maximizing a sum of generalized Rayleigh quotients.

Advisors



Dr. Thanh-Hieu Le

PhD Student



Thi Ngan Nguyen