Mẫu 1.2. Information on the new contributions of doctoral thesis

MINISTRY OF EDUCATION AND TRAINING QUY NHON UNIVERSITY

SOCIALIST REPUBLIC OF VIETNAM Independence – Freedom - Happiness

Binh Dinh, August 24, 2024

INFORMATION ON THE NEW CONTRIBUTIONS OF DOCTORAL THESIS

(Information will be posted on the Website)

Title: Liouvillan solutions of first-order algebraic ordinary differential equations

Speciality: Algebra and number theory Code No.: 9460104

PhD student: Nguyen Tri Dat

Course: 2020-2024

Advisors: 1. Advisor 1: Dr. Ngo Lam Xuan Chau

2. Advisor 2: Assoc. Prof. Dr. Le Cong Trinh

Training institution: Quy Nhon University

NEW CONTRIBUTIONS OF THE THESIS

- 1. Define rational liouvillian solutions and propose Algorithm RatLiouSol for finding rational liouvillian solutions of first-order autonomous algebraic ordinary differential equations (AODEs).
- 2. Show that a liouvillian solution of a first-order autonomous AODE of genus zero must be a rational liouvillian solution and give Algorithm LiouSolAut for determining and classifying such a liouvillian solution in algebraic and transcendental cases.
- 3. Propose Algorithm LiouSol for finding liouvillian solutions of first-order AODEs of genus zero (included autonomous and non-autonomous cases).
- 4. Define power transformations and give Algorithm RedPol to obtain reduced forms of first-order AODEs. This result leads to a method for determining liouvillian solutions of first-order AODEs of positive genera in case their reduced forms are of genus zero.
- 5. Transform the problem of solving first-order AODEs with coefficients in a liouvillian extension of $\mathbb{C}(x)$ into the case of solving AODEs with coefficients in a rational field $\mathbb{C}(z)$ by means of change of variables.

Advisors

PhD Student

Assoc. Prof. Dr. Le Cong Trinh

Nguyen Tri Dat