

Information on Doctoral thesis of Fellows Vu Tien Viet

1. Full name: Vũ Tiến Việt
2. Sex: Male
3. Date of birth: 05th March, 1955
4. Place of birth: Hưng Yên
5. Admission decision number: 3614/QĐ-SĐH dated 22nd October, 2009 by Director of VNU (Vietnam National University, Hanoi)
6. Changes in academic procedure: No
7. Official thesis process: Discrete Implicit Stochastic Dynamical System and Applications
8. Major: Theory of Probability and Mathematical Statistics
9. Code: 62 46 15 01
10. Supervisors: Principle: Prof.Dr. Nguyễn Hữu Dư

Supplementary: Dr. Nguyễn Hồng Hải

11. Summary of the new findings of the thesis:

In the thesis we have achieved the following:

Introduction of the *index 1* of an implicit linear stochastic difference system. Under the condition of index 1 of the system, we provide the formulation of solution of the related Cauchy problem.

A dynamic property of the Cauchy operator is also showed.

The solution's Lyapunov exponent is studied; the partition of Furstenber-Kiffer is provided, and we also proved the Multiplicative Ergodic Theorem of the system.

For system that failed to satisfy the index-1 condition, we introduce the index 2, which is seen as the *index 1 of the index 1*.

Under the index-2 condition, we provided the resolution of the Cauchy problem, with its solution.

Similar to the previous part, we also studied the Lyapunov exponent of the solution, as well as the partition of Furstenber-Kiffer and the Multiplicative Ergodic Theorem.

12. Practical applicability, if any:

Our results can be applied to reality problems. In the Annex, we introduced the application of the results to the electrical circuit simulation problem.

13. Further research directions, if any:

Our approaching method to the implicit linear stochastic difference system is new and different from the existing methods. It can be improved to define higher indexes to the considered system, and continue further studies in this subject.

14: Thesis related publications:

[1]. N. H. Du, T. K. Duy, and V. T. Viet (2007). "Degenerate cocycle with index-1 and Lyapunov exponents", *Stoch. Dyn.*, 7(2), pp. 229--245.

[2]. N. H. Du, L.C. Loi, T. K. Duy, and V. T. Viet (2011), "On index-2 linear implicit difference equations", *Linear Algebra and its Applications*, 434, pp. 394--414.