VIASM
VIETNAM INSTITUTE FOR
ADVANCED STUDY IN MATHEMATICS

Summer School and Workshop

ADVANCED NUMERICAL METHODS FOR DETERMINISTIC AND STOCHASTIC DIFFERENTIAL EQUATIONS

Summer School: June 9-12, 2025
Workshop: June 13-14, 2025

Room A502, VIASM

https://viasm.edu.vn/hdkh/summer-school-on-anm2025

Organizers: Vu Thai Luan (TTU), Ngo Hoang Long (HNUE), Le Minh Ha (VIASM)

Sponsored by: Vietnam Institute for Advanced Study in Mathematics (VIASM)
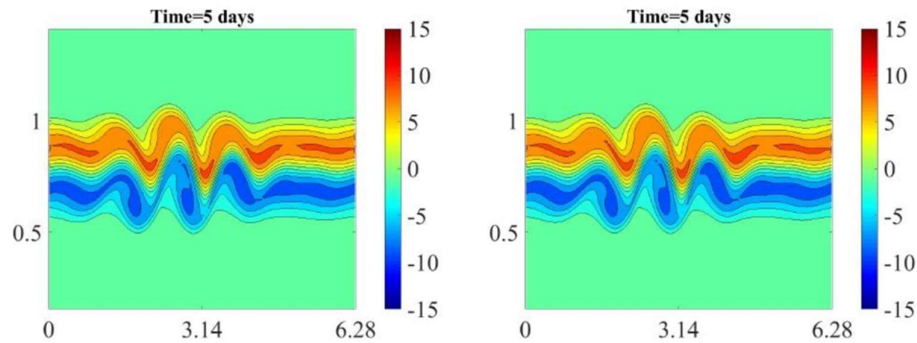
SUMMER SCHOOL

Day 1: June 9, 2025 (Monday)

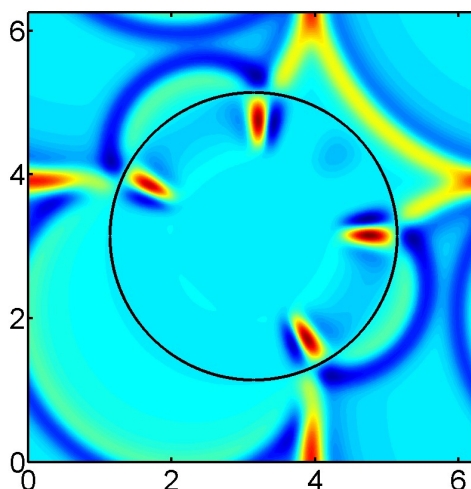| Time	Content
8:30 - 10:00	**Vu Thai Luan** (Texas Tech University, USA) *An Introduction to Numerical Methods for Solving Differential Equations*
10:00 - 10:30	Coffee Break
10:30 - 12:00	**David Shirokoff** (New Jersey Institute of Technology, USA) *Overview of Runge-Kutta Methods and Order Reduction*
12:00 - 13:30	Lunch Break
13:30 - 15:00	**Daniel Reynolds** (Southern Methodist University, USA) *Implementation of Explicit and Diagonally Implicit Runge-Kutta methods*
15:00 - 15:30	Coffee Break
15:30 - 17:00	**Daniel Reynolds** (Southern Methodist University, USA) *Adaptive-step Runge-Kutta methods*

SUMMER SCHOOL

Day 2: June 10, 2025 (Tuesday)
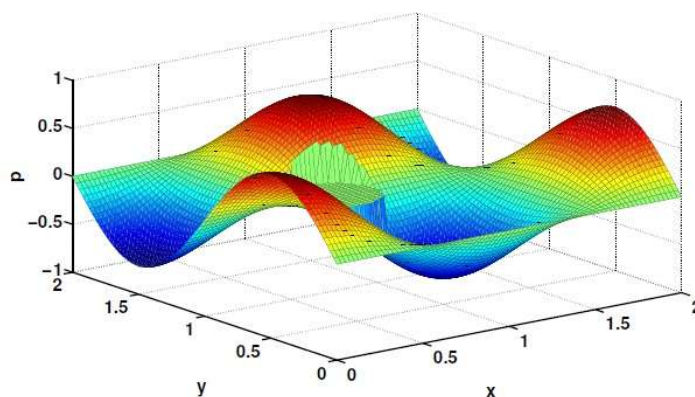
Time	Content
8:30 - 10:00	**Vu Thai Luan** (Texas Tech University, USA) *Exponential Time Integration Methods: Theory and Applications*
10:00 - 10:30	Coffee Break
10:30 - 12:00	**David Shirokoff** (New Jersey Institute of Technology, USA) *IMEX and Linearly Implicit Time Integration*
12:00 - 13:30	Lunch Break
13:30 - 15:00	**Kazuhiro Yasuda** (Hosei University, Japan) *Numerical Computation and Applications of Stochastic Differential Equations: Introduction*
15:00 - 15:30	Coffee Break
15:30 - 17:00	**Daniel Reynolds** (Southern Methodist University, USA) *Explicit Multirate Infinitesimal (MRI) Methods*

SUMMER SCHOOL

Day 3: June 11, 2025 (Wednesday)

Time	Content
8:30 - 10:00	**Kazuhiro Yasuda** (Hosei University, Japan) *Numerical Computation and Applications of Stochastic Differential Equations: Sensitivity Calculation*
10:00 - 10:30	Coffee Break
10:30 - 12:00	**Kazuhiro Yasuda** (Hosei University, Japan) *Numerical Computation and Applications of Stochastic Differential Equations: Stochastic Control Problem*
12:00 - 13:30	Lunch Break
13:30 - 15:00	**David Shirokoff** (New Jersey Institute of Technology, USA) *Stiff Order Conditions and Order Barriers for Runge-Kutta Methods*
15:00 - 15:30	Coffee Break
15:30 - 17:00	**Vu Thai Luan** (Texas Tech University, USA) *Implementation of Exponential Integrators*

WORKSHOP

Day 1: June 13, 2025 (Friday)
Chair: Vu Thai Luan

Time	Content
8:30 - 8:45	Opening Ceremony & Photo Session
8:45 - 9:45	**Qiang Du** (Columbia University, USA) *Integral Equations with Nonlocal Operators: From Modeling to Computation*
9:45 - 10:15	Coffee Break
10:15 - 10:55	**Daniel Reynolds** (Southern Methodist University, USA) *Flexible Time Integration Methods for Multiphysics PDE Systems*
10:55 - 11:35	**Raymond Spiteri** (University of Saskatchewan, Canada) *Fractional-Step Methods: Theory and Practice*
11:35 - 13:30	Lunch Break
13:30 - 14:10	**Lili Ju** (University of South Carolina, USA) *Dynamically regularized Lagrange multiplier method for the Cahn-Hilliard-Navier-Stokes system*
14:10 - 14:50	**Eskil Hansen** (Lund University, Sweden) *Convergence analysis of the nonoverlapping Robin-Robin method for nonlinear elliptic equations*
14:50 - 15:30	**Amnon J Meir** (Southern Methodist University, USA) *On the Equations of Electroporoelasticity*
15:30 - 15:45	Coffee Break
15:45 - 16:25	**Dai Taguchi** (Kansai University, Japan) *Approximation of irregular functionals of SDEs*
16:25 - 16:40	**Tran Ngoc Khue** (Hanoi University of Science & Technology, Vietnam) *Density estimates for jump diffusion processes*
16:40 - 16:55	**Takuya Nakagawa** (Ritsumeikan University, Japan) *Semi-implicit Euler–Maruyama scheme for polynomial diffusions on the unit ball*
16:55 - 17:10	**Nguyen Van Hoang** (Texas Tech University, USA) *Two-derivative exponential methods for stiff PDEs*
17:10 - 17:25	**Pham Quang Huy** (Texas Tech University, USA) *Exponential Nyström methods for systems of second-order differential equations*

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WORKSHOP

Day 2: June 14, 2025 (Saturday)
Chair: Ngo Hoang Long

Time	Content
8:30 - 9:30	**Yoshio Komori** (Kyushu Institute of Technology, Japan) *A research on numerical computations for high-dimensional stochastic differential equations*
9:30 - 10:00	Coffee Break
10:00 - 10:40	**Dang Quang A** (Vietnam Academy of Science & Technology) *A novel efficient approach to the solution of nonlinear boundary value problems*
10:40 - 11:20	**Kazuhiro Yasuda** (Hosei University, Japan) *Exact Simulation of Multi-Dimensional Hawkes Processes with Non-Gaussian Intensity*
11:20 - 12:00	**David Shirokoff** (New Jersey Institute of Technology, USA) *Convergence of Markov Chains for Constant Step Size Stochastic Gradient Descent with Separable Functions*
12:00 - 13:30	Lunch Break
13:30 - 14:10	**Begoña Cano** (University of Valladolid, Spain) *Long-term behaviour of symmetric partitioned linear multistep methods*
14:10 - 14:50	**Vu Thai Luan** (Texas Tech University, USA) *Innovative Time integrators for Stiff and Highly Oscillatory Problems*
14:50 - 15:30	**Ngo Hoang Long** (Hanoi National University of Education, Vietnam) *Numerical methods for stochastic Volterra integral equations with general singular kernels and jumps*
15:30 - 15:45	Coffee Break
15:45 - 16:25	**Do Duc Thuan** (Hanoi University of Science & Technology, Vietnam) *Stability and stabilizability of positive switched discrete-time linear singular systems*
16:25 - 17:05	**Luong Duc Trong** (Hanoi National University of Education, Vietnam) *On the infinite time horizon approximation for Levy-driven McKean-Vlasov SDEs with nonglobally Lipschitz continuous and super-linearly growth drift and diffusion coefficients*
17:05 - 17:20	**Le Vu Anh** (Massachusetts Institute of Technology, USA) *A Mathematical Analysis of Neural Operator Behaviors*
17:20 - 17:25	Closing Remarks