Monday, February 20

Morning

07:30 – 08:30 Registration (at Lecture Hall 613)

08:30 – 08:45 Opening ceremony (Lecture Hall 613)

08:45 – 09:30

Chair: JongHae Keum (KIAS)

Sijong Kwak (KAIST)

Regularity of the structure sheaves and Castelnuovo normality of smooth varieties page 29

09:30 – 10:00 Break

Time	A/Room 304	D/Room 305	O/Room 307	P/Room 308
10:00-10:40	M.H. Kim (A1)	U. Jung (D1)	G.M. Lee (O1)	J. Han (P1)
10:40-10:50	Break			
10:50-11:30	D.T. Hiep (A2)	N.T. Nhan (D2)	L.T. Hieu (O2) V.T. Huong (O3)	D.T. Son (P2) P.C. Dan (P3)

Afternoon

14:00 – 14:45 (Room 702)

Chair: Vu Hoang Linh (Hanoi Univ. Sci.)

Keonhee Lee (Chungnam Univ)

Dynamics Beyond Hyperbolicity page 29

14:45 – 15:15 Break

Time	A/Room 304	D/Room 305	O/Room 307	P/Room 308
15:15-15:55	Y. Lee (A3)	J. Yoo (D3)	P.Q. Khanh (O4)	N.T.N. Oanh (P4)
15:55-16:05	Break			
16:05-16:45	D.T. Hieu (A4)	N.N. Thach (D4) J. Park (D5)	N.T. Hieu (O5) P.Q. Muoi (O6)	N.V. Dac (P5) L.T. Giang (P6)
16:45-17:05	Break	Break	N.V. Luong (O7)	
17:05-17:45	Y.R. Kim (A5)	S. Lee (D6) B. Kang (D7)		

Tuesday, February 21

Morning

08:30 – 09:15 (Room 702)

Chair: **Dinh Nho Hao (IMH)**
Hyeong-Ohk Bae (Ajou Univ.)
Short time regularity to unsteady shear thickening incompressible fluids page 29

09:15 – 9:35 Break

Time	A/Room 304	D/Room 305	O/Room 307	P/Room 308
09:35-10:15	P.H. Hai (A6)	N. Koo (D8)	S. Kum (O8)	S.B. Yun (P7)
10:15-10:25	Break			
10:25-11:05	H. Kim (A7)	Y.W. Nam (D9)	L.D. Muu (O9)	B.V. Huong (P8) J. Roh (P9)
11:05-11:25	Break	Break	B.V. Dinh (O10)	
11:25-12:05	L.V.Thuyet (A8)	S.H. Lee (D10) J. Oh (D11)		

Afternoon

14:00 – 14:45 (Room 702)

Chair: **Gue Myung Lee (Pukyong Nat. Uni.)**
Nguyen Dinh (Inter. Uni. - HCM)
A unified approach to Robust Farkas-type results with applications page 30

14:45 – 15:15 Break

Time	D/Room 305	O/Room 307	P/Room 308
15:15-15:55	S. Jeong (D12)	T.X.D. Ha (O11)	C.T. Anh (P10)
15:55-16:05	Break		
16:05-16:45	S. Hong (D13)	N.X. Tan (O12) N.H. Muoi (O13)	M. Kwak (P11)
16:45-17:05	Break		
17:05-17:45	H.M. Hien (D14) J. Ahn (D15)	N.T. An (O14) N.V. Tuyen (O15)	Y.H. Kim (P12) Break

Wednesday, February 22

Morning

08:30 – 09:15 (Room 702)

Chair: **Vu Ngoc Phat (IMH)**
Nguyen Huu Du (VIASM)
Dynamical behavior of population in random environment page 31

09:15 – 9:35 Break

Time	**A/Room 304**	**D/Room 305**	**O/Room 307**	**P/Room 308**
09:35-10:15	Y. Kim (A9)	S.M. Jung (D16)	N.D. Yen (O16)	H. Bae (P13)
10:15-10:25	Break			
10:25-11:05	C.H. Linh (A10)	D.Y. Kwon (D17)	N.N. Tam (O17) D.T.K. Huyen (O18)	P.Q. Sang (P14) D.A. Tuan (P15)
11:05-11:25		Break	D.T.V.An (O19)	Break
11:25-12:05		L.H. Tien (D18)		S.Y. Ha (P16)

Afternoon

13:30 – 18:00 City tour
19:00 – Banquet

Thursday, February 23

Morning

08:30 – 09:15 (Room 702)

Chair: **Ngo Viet Trung (IMH)**
Ngo Dac Tuan (Univ. Caen Normandy)
Special L-values of Drinfeld modules and applications page 32

09:15 – 9:35 Break

Time	**A/Room 304**	**D/Room 305**	**O/Room 307**	**P/Room 308**
09:35-10:15	L.C. Trinh (A11)	M. Lee (D19)	P.N. Anh (O20)	V.T. Luong (P17) V.M. Toi (P18)
10:15-10:25	Break			
10:25-11:05	J. Ahn (A12)	N.T.T. Nga (D20) S.J. Kim (D21)	P.T. Son (O21) N.V. Bong (O22)	
11:05-11:25	D. Ka (A13)		T.T.H. Anh (O23)	

Afternoon

14:00 – 14:45 (Room 702)

Chair: **Seung Yeal Ha (Seoul Nati. Univ.)**
Pham Hoang Hiep (IMH),
Regularity of complex Monge-Ampere equation page 32

14:45 – 15:15 Break

Time	**A/Room 304**	**D/Room 305**	**O/Room 307**
15:15-15:55	Y. Woo (A14)	L.D. Nhien (D22) N.T.Dieu (D23)	P.N. Tinh (O24)
15:55-16:05	Break		
16:05-16:45	S.Huh (A15) L.V. Lam (A16)	N.D. Truong (D24) L.A. Tuan (D25)	T.M. Nguyet (O25) Break

Friday, February 24

Morning

08:30 – 09:15 (Room 702)

Chair: **Dang Duc Trong (Univ. Sci. VNU-HCM)**

Yongdo Lim (Sungkyunkwan Uni.)

Gradient projection methods for Wasserstein barycenters of Gaussian measures page 31

09:15 – 9:35 Break

9:35 – 11:00 (Room 702)

Chair: **Le Tuan Hoa (IMH)**

Free discussion on Korea Vietnam cooperation

11:00 Closing ceremony

A: Session: Algebra, Geometry, Topology and Number Theory

Room 304

Monday, February 20

Morning

Chair: Nguyen Tu Cuong (IMH)

10h – 10:40 Myung-Hwan Kim (Seoul Nati. Univ.)
A1 *Representations of quadratic forms*

10:40 – 10:50 Break

10:50 – 11:30 Dang Tuan Hiep (NCTS, Taiwan)
A2 *Gromov-Witten invariants associated to rational curves on hypersurfaces*

Afternoon

Chair: Jongil Park (Seoul Nati. Univ.)

15:15 – 15:55 Yongnam Lee (KAIST)
A3 *On rational maps from a hypersurface section of a Fano 3-fold and its double cover*

15:55 – 16:05 Break

16:05 – 16:45 Doan The Hieu (Coll. Edu., Hue Univ.)
A4 *Zero f-mean curvature surfaces of revolution in the Lorentzian product $\mathbb{G}^2 \times \mathbb{R}_1$.*

16:45 – 17:05 Break

17:05 – 17:45 Young Rock Kim (Hankuk Univ. Foreign Stu.)
A5 *Geometric structure of phase tropical hypersurfaces*

Tuesday, February 21

Morning

Chair: Yongnam Lee (KAIST)

9:35 – 10:15 Phung Ho Hai (IMH)
A6 *On the structure of Nori's fundamental group scheme*

10:15 – 10:25 Break

10:25 – 11:05 Hosung Kim (NIMS)
A7 *Varieties of minimal rational tangents on Veronese double cones*

11:05 – 11:25 Break

11:25 – 12:05 Le Van Thuyet (Coll. Edu., Hue Univ.)
A8 *Some results on modules which are invariant under idempotent of their envelopes*

Wednesday, February 22

Morning

Chair: Young Rock Kim (Hankuk Univ. Foreign Stu.))

9:35 – 10:15 Youngsu Kim (Univ. California, Riverside)
A9 *Defining ideals of Rees algebras and special fiber rings*

10:15 – 10:25 Break

10:25 – 11:05 Cao Huy Linh (Coll. Edu., Hue Univ.)
A10 *Castelnuovo - Mumford regularity and Hilbert coefficients of parameter ideals*

Thursday, February 23

Morning

Chair: Le Van Thuyet (Coll. Edu., Hue Univ.)

9:35 – 10:15 Le Cong Trinh (Quy Nhon Univ.)
A11 *On the location of eigenvalues of matrix polynomials*

10:15 – 10:25 Break

10:25 – 11:05 Jeaman Ahn (Kongju Nati. University)
A12 *Non-unimodal Gorenstein sequences and Green theorem*

11:05 – 11:25 Dongseok Ka (Chungnam Nati. Univ.)
A13 *Exponential sum and weight enumerators of linear codes*

Afternoon

Chair: Euisung Park (Korea Univ.)

15:15 – 15:55 Youngho Woo (NIMS)
A14 *Regularity and Multisecant lines of finite schemes*

15:55 – 16:05 Break

16:05 – 16:25 Sukmoon Huh (Sungkyunkwan Univ.)
A15 *Arithmetically Cohen-Macaulay sheaves on the double plane*

16:25 – 16:45 Lien Vuong Lam (Pham Van Dong Univ.)
A16 *Cross theorems for separately (.,W)-meromorphic functions*

D: Session: Dynamical Systems

Room 305

Monday, February 20

Morning

Chair: Nguyen Huu Du (VIASM)

10h – 10:40 Uijin Jung (Ajou Univ.)
D1 *Constructions of expansive topological dynamical systems with uncountably many topologically transitive components*

10:40 – 10:50 Break

10:50 – 11:30 Ngo Thoi Nhan (Hue Coll. Economics)
D2 *Lightening the assumption for Pontryagin principles in infinite horizon and discrete time*

Afternoon

Chair: Vu Hoang Linh (Hanoi Univ. Sci.)

15:15 – 15:55 Jisang Yoo (Seoul Nati. Univ.)
D3 *Decomposition of factor codes*

15:55 – 16:05 Break

16:05 – 16:25 Nguyen Ngoc Thach (Chungnam Nati. Univ.)
D4 *Weak expansive measures for flows*

16:25 – 16:45 Junmi Park (Mokwon Univ.)
D5 *Hyperbolicity of a type of limit shadowing*

16:45 – 17:05 Break

17:05 – 17:25 Seunghee Lee (NIMS)
D6 *Transitive sets of discrete dynamical systems*

17:25 – 17:45 Bowon Kang (Chungnam Nati. Univ.)
D7 *Entropy of continuous maps with shadowing properties*

Tuesday, February 21

Morning

Chair: Soon-Mo Jung (Hongik Univ.)

9:35 – 10:15 Namjip Koo (Chungnam Nati. Univ.)
D8 *Converse Lyapunov theorems via impulsive variational systems*

10:15 – 10:25 Break

10:25 – 11:05 Young Woo Nam (Hongik Univ.)
D9 *Shadowing properties in the Julia set of one dimensional expanding maps*

11:05 – 11:25 Break

11:25 – 11:45 Sang Hoon Lee (Chungnam Nati. Univ.)
D10 *Lifting problem for commuting subnormals*

11:45 – 12:05 Jumi Oh (Sungkyunkwan Univ.)
D11 *Measure expansiveness of semiflows with positive entropy*

Afternoon

Chair: Do Yong Kwon (Chonnam Nati. Univ.)

15:15 – 15:55 Sangtae Jeong (Inha Univ.)
D12 *Measure-preservation criteria for a certain class of 1-Lipschitz functions on $\mathbb{Z}_p$ in Mahler's expansion*

15:55 – 16:05 Break

16:05 – 16:45 Soonjo Hong (NIMS)
D13 *Transformatio of Gibbs measures*

16:45 – 17:05 Break

17:05 – 17:25 Huynh Minh Hien (Quy Nhon Univ.)
D14 *Partner orbits and action differences on compact factors of the hyperbolic plane*

17:25 – 17:45 Jiweon Ahn (Chungnam Nati. Univ.)
D15 *Topological stability of expansive measures*

Wednesday, February 22

Morning

Chair: Uijin Jung (Ajou Univ.)

9:35 – 10:15 Soon-Mo Jung (Hongik Univ.)
D16 *The linear differential equations with complex constant coefficients and Schroedinger equations*

10:15 – 10:25 Break

10:25 – 11:05 Do Yong Kwon (Chonnam Nati. Univ.)
D17 *Dynamics of β-transformations and unique expansions over ternary alphabets*

11:05 – 11:25 Break

11:25 – 12:05 Le Huy Tien (Hanoi Univ. Sci.)
D18 *Invariant manifolds for dynamic systems with dominated splitting*

Thursday, February 23

Morning

Chair: Soonjo Hong (NIMS)

9:35 – 10:15 Manseob Lee (Mokwon Univ.)
D19 *Lyapunov stable homoclinic classes with shadowing for flows*

10:15 – 10:25 Break

10:25 – 10:45 Ngo Thi Thanh Nga (Thang Long Univ.)
D20 *Bohl-Perron type stability theorems for linear singular difference equations.*

10:45 – 11:05 Sang Jin Kim (Chungnam Nati. Univ.)
D21 *Shadowing and Inverse shadowing in Group actions*

11:05 – 11:25 Break

Afternoon

Chair: Jisang Yoo (Seoul Nati. Univ.)

15:15 – 15:35 Le Duc Nhien (Hanoi Univ. Sci.)
D22 *On the topological entropy of nonautonomous systems*

15:35 – 15:55 Nguyen Thanh Dieu (Vinh Univ.)
D23 *Classification of asymptotic behavior of the stochastic SIR epidemic models*

15:55 – 16:05 Break

16:05 – 16:25 Nguyen Duy Truong (Tran Quoc Tuan Univ.)
D24 *Numerical solution for a class of structured strangeness-free differential-algebraic equations by linear multistep methods*

16:25 – 16:45 Le Anh Tuan (Hanoi Univ. Industry)
D25 *Stochastic dynamic delay equation on time scale*

O: Session: Optimization

Room 307

Monday, February 20

Morning

Chair: Nguyen Dong Yen (IMH)

10h – 10:40 Gue Myung Lee (Pukyong Nati. Univ.)
O1 *On robust semi-infinite multiobjective optimization problems*

10:40 – 10:50 Break

10:50 – 11:10 Le Thanh Hieu (Quy Nhon Univ.)
O2 *Rank-one solutions to systems of linear matrix equations and application to filter design problem*

11:10 – 11:30 Vu Thi Huong (IMH)
O3 *On the stability and solution sensitivity of a consumer problem*

Afternoon

Chair: Yongdo Lim (Sungkyunkwan Univ.)

15:15 – 15:55 Phan Quoc Khanh (Inter. Univ. VNU-HCM)
O4 *Linear and nonlinear metric regularity and optimality conditions*

15:55 – 16:05 Break

16:05 – 16:25 Nguyen Trung Hieu (Duy Tan Univ.)
O5 *Balancing domain decomposition by constraints and perturbation*

16:25 – 16:45 Pham Qui Muoi (University of Education, Danang)
O6 *Inverse problems with nonnegative and sparse solutions: Algorithms and application to phase retrieve problem*

16:45 – 17:05 Nguyen Van Luong (Hong Duc Univ.)
O7 *Minimal time function associated with a collection of sets in normed spaces*

Tuesday, February 21

Morning

Chair: Nguyen Khoa Son (IMH)

9:35 – 10:15 Sangho Kum (Chungbuk Nati. Univ.)
O8 *Incremental gradient method for Karcher mean on symmetric cones*

10:15 – 10:25 Break

10:25 – 11:05 Le Dung Muu (IMH)
O9 *Quasinonexpansive mappings involving pseudomonotone bifunctions*

11:05 – 11:25 Bui Van Dinh (Le Quy Don Tech. Univ.)
O10 *Extragradient-proximal methods for split equilibrium and fixed point problems in Hilbert spaces*

Afternoon

Chair: Gue Myung Lee (Pukyong Nati. Univ.)

15:15 – 15:55 Truong Xuan Duc Ha (IMH)
O11 *Some results about error bounds and weak sharp minima in the vector case*

15:55 – 16:05 Break

16:05 – 16:25 Nguyen Xuan Tan (IMH)
O12 *Quasi-equilibrium problems and fixed point theorems of the sum of lower and upper semicontinuous mappings*

16:25 – 16:45 Nguyen Huyen Muoi (IMH)
O13 *New criteria for robust finite-time stabilization of linear singular systems with time-varying delay*

16:45 – 17:05 Break

17:05 – 17:25 Nguyen Thai An (Thua Thien Hue Coll. Edu.)
O14 *Convergence analysis of a proximal point algorithm for minimizing differences of functions*

17:25 – 17:45 Nguyen Van Tuyen (Hanoi Pedagogical Univ. No. 2)
O15 *Strong second-order Karush-Kuhn-Tucker optimality conditions for vector optimization*

Wednesday, February 22

Morning

Chair: Nguyen Dinh (Inter. Univ., VNU-HCM)

9:35 – 10:15 Nguyen Dong Yen (IMH)
O16 *Affine variational inequalities on normed spaces*

10:15 – 10:25 Break

10:25 – 10:45 Nguyen Nang Tam (Hanoi Pedagogical Univ. No. 2)
O17 *Solution existence for quadratic programs in Banach spaces*

10:45 – 11:05 Duong Thi Kim Huyen (IMH)
O18 *Sensitivity analysis of an optimization problem under nonlinear perturbations*

11:05 – 11:25 Duong Thi Viet An (Coll. Sci., Thai Nguyen Univ.)
O19 *Differential stability of a class of convex optimal control problems*

Thursday, February 23

Morning

Chair: Sangho Kum (Chungbuk Nati. Univ.)

9:35 – 10:15 Pham Ngoc Anh (Posts and Telecom. Inst. Tech.)
O20 *Mann-extragradient method for unrelated variational inequalities and fixed point problems*

10:15 – 10:25 Break

10:25 – 10:45 Pham Tien Son (Univ. Dalat)
O21 *On the existence of Pareto solutions for semi-algebraic vector optimization problems*

10:45 – 11:05 Nguyen Van Bong (Tay Nguyen Univ.)
O22 *Nonconvex quadratic program over a generalized second-order cone and linear equalities*

11:05 – 11:25 Tran Thi Hoang Anh (Hai Phong Univ.)
O23 *On solution mapping of equilibrium problems*

Afternoon

Chair: Nguyen Xuan Tan (IMH)

15:15 – 15:55 Phan Nhat Tinh (Univ. Hue)
O24 *Optimality conditions for nonsmooth vector problems in normed space via generalized Hadamard directional derivatives*

15:55 – 16:05 Break

16:05 – 16:25 Tran Minh Nguyet (Thang Long Univ.)
O25 *Optimal control of the 3D Navier-Stokes-Voigt equations*

P: Session: Ordinary and Partial Differential Equations

Room 308

Monday, February 20

Morning

Chair: Cung The Anh (Hanoi Nati. Univ. Edu.)

10h – 10:40 Jongmin Han (Kyung Hee Univ.)
P1 *Classification of string solutions for the self-dual Einstein-Maxwell-Higgs model*

10:40 – 10:50 Break

10:50 – 11:10 Dang Thanh Son (Telecom. Univ.)
P2 *An optimal control problem of the 3D viscous Camassa-Holm equations*

11:10 – 11:30 Pham Cong Dan (Duy Tan Univ.)
P3 *The infinite differentiability of the speed for excited random walks*

Afternoon

Chair: Yun, Seok-Bae (Sungkyunkwan Univ.)

15:15 – 15:55 Nguyen Thi Ngoc Oanh (Coll. Sci., Thainguyen Univ.)
P4 *Data assimilation in heat conduction*

15:55 – 16:05 Break

16:05 – 16:25 Nguyen Van Dac (Thuy Loi Univ.)
P5 *Pullback attractor for differential evolution inclusions with delays*

16:25 – 16:45 Le Truong Giang (Univ. Fin. Marketing)
P6 *Some results relating to limit theorems for extended random summation of m-dependent random variables*

Tuesday, February 21

Morning

Chair: Jongmin Han (Kyung Hee Univ.)

9:35 – 10:15 Seok-Bae Yun (Sungkyunkwan Univ.)
P7 *Ellipsoidal BGK model for polyatomic particles*

10:15 – 10:25 Break

10:25 – 10:45 Bui Viet Huong (Coll. Scie., Thainguyen Univ.)
P8 *Determination of a term in right-hand side of parabolic equations*

10:45 – 11:05 Jaiok Roh (Hallym Univ.)
P9 *Function spaces for the incompressible flows*

Afternoon

Chair: Seung Yeal Ha (Seoul Nati. Univ.)

15:15 – 15:55 Cung The Anh (Hanoi Nati. Univ. Edu.)
P10 *Decay rates of solutions to some α-models in fluid mechanics*

15:55 – 16:05 Break

16:05 – 16:45 Minkyu Kwak (Chonnam Nati. Univ.)
P11 *The cone property of parabolic partial differential equations*

16:45 – 17:05 Break

17:05 – 17:25 Young-Ho Kim (Changwon Nati. Univ.)
P12 *Note on a difference between the approximate solution and accurate solution to SDDE*

Wednesday, February 22

Morning

Chair: Tran Loc Hung (Univ. Fin. Marketing)

9:35 – 10:15 Hantaek Bae (Ulsan Nati. Inst. Sci. Tech.)
P13 *Vortex Patches of Serfati*

10:15 – 10:25 Break

10:25 – 10:45 Phan Quang Sang (Vietnam National Univ. Agriculture)
P14 *Spectral monodromy of small non-selfadjoint perturbations of nearly integrable Hamiltonians*

10:45 – 11:05 Dang Anh Tuan (Hanoi University of Science VNU)
P15 *Lipschitz stability for inverse conductivity problem*

11:05 – 11:25 Break

Chair: Dinh Nho Hao (IMH)

11:25 – 12:05 Seung Yeal Ha (Seoul Nati. Univ.)
P16 *Mathematical Challenges of classical and quantum synchronization*

Thursday, February 23

Morning

Chair: Nguyen Thi Ngoc Oanh (Coll. Sci., Thainguyen Univ.)

9:35 – 9:55 Vu Trong Luong (Tay Bac Univ.)
P17 *Polynomial decay of mild solutions to two-term time fractional differential equations*

9:55 – 10:15 Vu Manh Toi (Thuy Loi Univ.)
P18 *Feedback control of the 3D Navier-Stokes-α equations by finite determining parameters*

ABSTRACTS

PL: Plenary

PL1: Regularity of the structure sheaves and Castelnuovo normality of smooth varieties

Sijong Kwak

Korea Advanced Institute of Science and Technology

In this talk, I'd like to report some recent result on the regularities and Castelnuovo normality of smooth varieties. In addition, some counterexamples of Eisenbud-Goto conjecture for singular varieties due to Mccullough and Peeva will be introduced with some computations.

PL2: Dynamics beyond hyperbolicity

Keonhee Lee

Chungnam National University, Korea

Hyperbolic dynamical systems are nowadays fairly well understood from the topological and ergodic point of view. In this talk, we discuss some recent and ongoing works on the dynamics beyond hyperbolicity. In the first part, we will provide a characterization of robustly shadowable chain transitive sets for C^1-vector fields on compact smooth manifolds. In the second part, we extend the concepts of topological stability and pseudo-orbit tracing property from homeomorphisms to Borel measures, and prove that every expansive measure with the pseudo-orbit tracing property is topologically stable. This represents a measurable version of the stability theorem by Peter Walters. The first part is joint work with M. Reza and the second part is joint work with C. A. Morales.

PL3: Short time regualrity to unsteady shear thickening incompressible fluids

Hyeong-Ohk Bae

Ajou University, Korea

We address the existence of strong solutions to a system of equations of motion of an incompressible non-Newtonian fluid. Our aim is to prove the short-time existence of strong solutions for the case of shear thickening viscosity, which corresponds to the power law $\nu(\mathrm{D}) = |\mathrm{D}|^{q-2}\,(2 < q < +\infty)$. In particular, we find that global strong solutions exist whenever $q > 2.23\cdots$. The results are obtained by attening the boundary and by using the difference quotient method. Near the boundary, we use

weighted estimates in the normal direction. Joint work with Jörg Wolf.

PL4: A unified approach to Robust Farkas-type results with applications

Nguyen Dinh

International University, VNU-HCM

In this report we consider the inequality of the form:

$$\sup_{u\in\mathcal{U}} F_u(\cdot, 0_Y) \geq h, \tag{1}$$

where X, Y are locally convex Hausdorff topological vector spaces, $\mathcal{U} \neq \emptyset$ is an uncertainty set, $F_u : X \times Y \to \overline{\mathbb{R}}$ for each $u \in \mathcal{U}$, and $h : X \to \overline{\mathbb{R}}$ is a lower semicontinuous proper convex function.

We start by providing characterizations for different transcriptions of the inequality (1) via robust abstract perturbational duality and then, from these results, by considering a special form of F_u, namely, $F_u := f + g + k \circ H_u$, we get diverse characterizations of robust functional inequalities in different setting (such as, non-convex, DC, convex) and under different qualification conditions concerning different representations of the epigraph of the conjugate F_u^* of F_u. In turn, these results when applied to diverse robust composite functional inequalities, we get variants of robust Farkas-type results such as,

- Robust Farkas lemmas for general nonconvex conical systems,
- Robust Farkas lemmas for convex-DC systems,
- Robust/stable robust Farkas lemmas for convex systems,
- Robust Farkas lemmas for general linear systems in infinite dimensional spaces,
- Robust semi-infinite Farkas lemmas.

Many of the these Farkas-type results are new, the others cover/extend most of the known robust Farkas lemmas in the literature, and even better, the approach is general enough to face with unpublished situations.

The results are then applied to classes of robust DC and robust convex optimization problems, and strong Fenchel duality and stable-strong/strong Lagrange duality for these classes of robust problems are obtained.

Joint work with T. H. Mo, G. Vallet, M. Volle.

PL5: Dynamical behavior of population in random environment

Nguyen Huu Du

Vietnam Institute of Advanced Study in Mathematics (VIASM)

In this talk, we deal with the dynamic behavior of of population described by a differential euations perturbed by noise

$$\begin{cases} dx = xa_1(t, \xi(t), x, y)dt + b_1(t, \xi(t), x, y)dw_1 \\ dy = ya_2(t, \xi(t), x, y)dt + b_2(t, \xi(t), x, y)dw_2 \end{cases}$$

where, $(\xi(t))$ is a Markov process valued in a finite set; W_1, W_2 are two Brownian motions and $a_i,\ b_i, i = 1, 2$ are functions defined on $[0, \infty) \times \mathbb{R}^2_+$ to $mathbbR$.
This equation can be used to describe the evolution of eco-systems as well as the development of a financial markets under the random environment. The Markov noise $\xi(t)$ can be considered as a factor which switches environment conditions meanwhile W_1, W_2 are unpredictable perturbations. Knowing the long term behavior of the quantities $(x(t), y(t))$ of population plays an important role in making a policy to investigate, protect and control them.
We are interested in the description of the $\omega-$ limit set of each solution, the attractor. Also, we give sufficient and almost necessary conditions to the existence of stationary distribution of these systems and its stability.

References

[1] Du N. H, Dang N. H and Dieu N.T.; On stability in distribution of stochastic differential delay equations with Markovian switching, *Systems and Control Letters* **65**(1)(2013).

[2] Du, N. H.; Dang, N. H. and Yin, G.; Existence of Stationary Distributions for Kolmogorov Systems of Competitive Type under Telegraph Noise, *J. Differential Equations*, **257**(2014).

[3] Du, N. H.; Dang, N. H.; Asymptotic behavior of kolmogorov systems with predator-prey type in random environment, *Communications on Pure and Applied Analysis* , No 6**13**(2014)

[4] Hieu N. T., Du N. H., Auger P. and Dang N. H.; Dynamical behavior of a stochastic sirs epidemic model, *Math. Model. Nat. Phenom.*, no. 2 **10**(2015).

[5] Du, N. H.; Dang, N. H. and Yin, G.; Conditions for permanence and ergodicity of certain stochastic predator-prey models, *Journal of Applied Probability* no.1 **53**(2016).

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PL6: Special L-values of Drinfeld modules and applications

Ngo Dac Tuan

CNRS and University of Caen Normandy, France

In this talk, I will discuss a formula for special L-values of Drinfeld modules which gives function field analogues of the class number formula. In the genus 0 case, I will recall important results in this direction due to Taelman and several generalizations due to Fang and Angls-Pellarin-Tavares Ribeiro. Then I will report recent results in the higher genus case. If time permits, I will give arithmetic applications for Drinfeld-Hayes modules. This is a joint work with B. Angls and F. Tavares Ribeiro.

PL7: Regularity of complex Monge-Ampere equation

Pham Hoang Hiep

Institute of Mathematics, VAST

In this talk, we will present an overview of regularity and stability results for the complex Monge-Ampère equations on compact Kähler manifolds.

PL8: Gradient projection methods for Wasserstein barycenters of Gaussian measures

Yongdo Lim

Sungkyunkwan University, Korea

We are concerned with optimization methods for the Wasserstein least squares problem of Gaussian measures. Based on its equivalent form on the convex cone of positive definite matrices of fixed size and the strict convexity of the variance function, we present gradient projection methods and convergence analysis from Lipschitz continuity of the gradient function.

A: Algebra, Geometry, Topology and Number Theory

A1: Representations of Quadratic Forms

Myung-Hwan Kim

Seoul National University, Korea

The 11th problem, among the famous 23 problems of Hilbert, asks to determine, for two quadratic forms given, whether one represents the other. In the core of this problem lies the Local-Global Principle. In this survey talk, recent developments in two interesting topics on the principle will be introduced. One topic is about universal vs regular forms while the other is about Hsia-Kitaoka-Kneser type theorems and their generalization.

A2: Gromov-Witten invariants associated to rational curves on hypersurfaces

Dang Tuan Hiep

NCTS, Taiwan & University of Dalat, Vietnam

The aim of this talk is to present some formulae for Gromov-Witten invariants associated to rational curves on hypersurfaces. I will define Gromov-Witten invariants then focus on concrete examples coming from enumerative geometry of lines and conics. Some relations between the Gromov-Witten invariants and geometric ones are discussed. If time permits, I will talk about a joint work in progress with Professor Bumsig Kim.

A3: On rational maps from a hypersurface section of a Fano 3-fold and its double cover

Yongnam Lee

Mathematical Sciences, KAIST, Korea

In this talk, we treat dominant rational maps from a very general element in hypersurface sections of a smooth Fano 3-fold and its double cover to smooth projective surfaces. The method of our study combines the classification of algebraic surfaces and smooth Fano 3-folds, Hodge theory, and the deformation theory. This is a joint work with Gian Pietro Pirola.

A4: Zero f-mean curvature surfaces of revolution in the Lorentzian product $\mathbb{G}^2 \times \mathbb{R}_1$.

Doan The Hieu

College of education, Hue University, Vietnam

We classify (spacelike or timelike) surfaces of revolution with zero f-mean curvature in $\mathbb{G}^2 \times \mathbb{R}_1$. It is proved that an f- maximal surface of revolution is either a vertical plane or a spacelike f- Catenoid. For the timelike case, a timelike f-minimal surface is either a vertical plane containing z-axis, the cylinder $x^2 + y^2 = 1$, or a timelike f- Catenoid. Spacelike and timelike f-Catenoids are new examples of f-minimal surfaces in $\mathbb{G}^2 \times \mathbb{R}_1$.

A5: Geometric structure of phase tropical hypersurfaces

Young Rock Kim

Hankuk University of Foreign Studies, Korea

First, we define phase tropical hypersurfaces in terms of a degeneration data of smooth complex algebraic hypersurfaces in $(\mathbb{C}^*)^n$. Next, we prove that complex hyperplanes are diffeomorphic to their degeneration called phase tropical hyperplanes. More generally, using Mikhalkin's decomposition of smooth algebraic hypersurfaces into pairs-of-pants, we show that phase tropical hypersurfaces with smooth tropicalization, possess naturally a smooth differentiable structure. Moreover, we prove that phase tropical hypersurfaces arising from this way possess a natural symplectic structure.

A6: On the structure of Nori's fundamental group scheme

Phung Ho Hai

Institute of Mathematics, VAST

Let X/k be a proper, connected scheme, where k is a perfect field of characteristic $p > 0$. M. Nori defined in the 70s a pro-finite affine group scheme associated to X by applying Tannakian duality to the category of essentially finite vector bundles on X, which was introduced by himself. This group scheme is more general that the étale fundamental group scheme introduced by A. Grothendieck. P. Deligne calls it the true fundamental group of a proper scheme. This group scheme contains two parts, an étale part and a local part. The étale part gives back Grothendieck's étale fundamental group. In the joint works with H. Esnault and with J.P. dos Santos, we study the relationship between this two parts. In turns out that, when X is a curve

of degree larger than 1, the two part are really entangled with each other.

A7: Varieties of minimal rational tangents on Veronese double cones

Hosung Kim

National Institute for Mathematical Sciences

A rational curve C in a nonsingular variety X is standard if under the normalization $f : \mathbb{P}^1 \to C \subset X$, the vector bundle $f^*T(X)$ decomposes as $\mathcal{O}(2) \oplus \mathcal{O}(1)^p \oplus \mathcal{O}^q$ for some nonnegative integers satisfying $p + q = \dim X - 1$. For a Fano manifold X of Picard number one and a general point $x \in X$, a general rational curve of minimal degree through x is standard. It has been asked whether all rational curves of minimal degree through a general point x are standard. In this talk, we will give a negative answer to this question. This is a joint work with Jun-Muk Hwang.

A8: Some results on modules which are invariant under idempotent of their envelopes

Le Van Thuyet

Hue University's College of Education, Vietnam

A right R-module M is called quasi-injective if it is self-injective. Then in 1961, Johnson and Wong had the important result: A module M is quasi-injective if it is invariant under endomorphism of its envelope, i.e, $f(M) \geq M$, $\forall f \in End_R(E(M))$. We will consider the the generalization of envelope, that is, X-envelope. In this talk, we will study the class of modules which are invariant under idempotents of their X-evelopes. Moreover, some generalizations of X-idempotent-invariant modules are considered.

Joint work with Truong Cong Quynh and Phan Dan.

A9: Defining ideals of Rees algebras and special fiber rings

Youngsu Kim

University of California Riverside

Rees algebras have been studied intensively in both commutative algebra and algebraic geometry. One of the questions that has not been well understood is their defining ideals. For instance, generating degrees of defining ideals of Rees algebras of homogeneous ideals in $k[x, y]$, where k is a field, is not known in general. In this talk, we present a result on defining ideals of Rees algebras of certain codimension

2 perfect ideals. This is a joint work with Vivek Mukundan.

A10: Castelnuovo-Mumford regularity and Hilbert coefficients of parameter ideals

Cao Huy Linh

College of Education, Hue University, Vietnam

Let $(A, \mathfrak{m})$ be a noetherian local ring of dimension d. The ring A is called almost Cohen-Macaulay if $\text{depth}(A) \geq d-1$. In this talk, we will prove the non-positivity of the Hilbert coefficients of parameter ideals of the almost Cohen-Macaulay ring. We will also give a bound for the regularity of associated graded rings in terms of Hilbert coefficients of parameter ideals.

A11: On the location of eigenvalues of matrix polynomials

Le Cong Trinh

Quy Nhon University, Vietnam

Let $\mathbb{C}^{n\times n}$ denote the set of all $n \times n$ matrices whose entries in $\mathbb{C}$. For a *matrix polynomial* we mean the matrix-valued function in one complex variable of the form

$$P(z) = A_m z^m + \cdots + A_1 z + A_0,$$

where $A_i \in \mathbb{C}^{n\times n}$ for all $i = 0, \cdots, m$. If $A_m \neq 0$, $P(z)$ is called a matrix polynomial of *degree* m. When $A_m = I$, the identity matrix, the matrix polynomial $P(z)$ is called *monic*. A number $\lambda \in \mathbb{C}$ is called an *eigenvalue* of the matrix polynomial $P(z)$, if there exists a nonzero vector $x \in \mathbb{C}^n$ such that $P(\lambda)x = 0$. Then the vector x is called, as usual, an *eigenvector* associated to the eigenvalue λ. Note that each finite eigenvalue of $P(z)$ is a solution of the the *characteristic polynomial* $\det(P(z))$. The *polynomial eigenvalue problem (PEP)* is to find an eigenvalue λ and a non-zero vector $x \in \mathbb{C}^n$ such that $P(\lambda)x = 0$. For $m = 1$, (PEP) is actually the *generalized eigenvalue problem (GEP)*

$$Ax = \lambda Bx,$$

and, in addition, if $A_1 = I$, we have the standard eigenvalue problem

$$Ax = \lambda x.$$

For $m = 2$ we have the *quadratic eigenvalue problem (QEP)*. (QEP), and more generally (PEP), plays an important role in applications to science and engineering. We refer to [9] for a survey on applications of (QEP). Moreover, we refer to the book of I. Gohberg, P. Lancaster and L. Rodman [4] for a theory of matrix polynomials. Computing eigenvalues of matrix polynomials (even computing zeros of univariate

polynomials and eigenvalues of scalar matrices) is a hard problem. Therefore, it is useful to find the location of these eigenvalues. Note that, if A_m is singular, then $P(z)$ has an infinite eigenvalue, and if A_0 is singular then 0 is an eigenvalue of $P(z)$. Therefore, in order to find an upper bound and a lower bound for $|\lambda|$, *we always assume A_m and A_0 to be non-singular* In [5], N.J. Higham and F. Tisseur have given some bounds for eigenvalues of matrix polynomials based on the norm of their coefficient matrices. Continuing the idea of N.J. Higham and F. Tisseur, in this talk we establish some other bounds for the module of eigenvalues of the matrix polynomial $P(z)$, generalize some known results on the location of zeros of univariate polynomials given in [1, 2, 3, 6, 7, 8], and compare these bounds to those given by N.J. Higham and F. Tisseur.

Joint work with Nguyen Tran Duc and Du Thi Hoa Binh.

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A12: Non-unimodal Gorenstein sequences and Green theorem

Jeaman Ahn

Kongju National University, Korea

We study consequences, for a standard graded algebra, of extremal behavior in Green's Hyperplane Restriction Theorem. First, we extend his Theorem 4 from the case of a plane curve to the case of a hypersurface in a linear space. Second, assuming a certain Lefschetz condition, we give a connection to extremal behavior in Macaulay's theorem. We apply these results to show that (1,19,17,19,1) is not a Gorenstein sequence, and as a result we classify the sequences of the form $(1, a, a-2, a, 1)$ that are Gorenstein sequences.

A13: Exponential sum and weight enumerators of linear codes

Dongseok Ka

Chungnam National University, Korea

In this talk, we present results on the weight enumerators of linear codes in two parts. We first mention the complete weight enumerators of a class of linear codes $\mathcal{C}_D$ using exponential sum. Next, we compute weight enumerators of punctured linear codes of $\mathcal{C}_D$. This talk is based on a joint work with J. Ahn and C. Li.

A14: Regularity and Multisecant lines of finite schemes

Youngho Woo

National Institute for Mathematical Sciences, Korea

For a nondegenerate finite subscheme Z in a projective space, let $reg(Z)$ and $l(Z)$ be respectively the regularity of Z and the largest integer l such that there exists an l-secant line to Z. It is always true that $reg(Z) \geq l(Z)$. In this talk, we show that if $reg(Z)$ is big enough then is $reg(Z) = l(Z)$. This is a joint work with E. Park and W. Lee.

A15: Arithmetically Cohen-Macaulay sheaves on the double plane

Sukmoon Huh

Sungkyunkwan University, Korea

A classical question is to ask if a general homogeneous polynomial can be written as a determinant of linear forms, and the positive answer for cubic polynomials in four variables was given about 150 years ago. But the negative answer for bigger number of variables can be easily given, due to the singularities of determinantal hypersurfaces. But the question is still open for a suitable power of polynoimals. In algebraic geometry, this question is translated to vanishing of certain cohomologies of some vector bundles on a hypersurface defined by the given polynomial.

A weaker condition of vanishing enables us to define a new category of sheaves, called the arithmetically Cohen-Macaulay (for short, aCM) sheaves. They are locally Cohen-Macaulay and with no intermediate cohomology. They are expected to measure the complexity of the base variety and play a role of building blocks for the derived categories of coherent sheaves. In this talk, we report our recent result on the classification of aCM sheaves on quadric surfaces. This is a joint work with Edoardo Ballico (Trento), Francesco Malaspina (Torino), Joan Pons-Llopis (Kyoto).

A16: Cross theorems for separately $(.,W)-$meromorphic functions

Lien Vuong Lam

Pham Van Dong University, Viet Nam

In this talk, we show that Rothstein's theorem holds for (F,W)-meromorphic functions with F being a sequentially complete locally convex space. We also prove that a meromorphic function on a Riemann domain D over a separable Banach E with values in a sequentially complete locally convex space can be extended meromorphically to the envelope of holomorphy $\widehat{D}$ of D. Using these results, in the remaining parts, we give a version of Kazarian's theorem for the class of separately $(\cdot,W)$-meromorphic functions with values in a sequentially complete locally convex space and generalize cross theorem with pluripolar singularities of Jarnicki and Pflug for separately $(\cdot,W)$-meromorphic functions with values in a Fréchet space.

Joint work with Thai Thuan Quang.

D: Dynamical Systems

D1: Constructions of expansive topological dynamical systems with uncountably many topologically transitive components

Uijin Jung

Ajou University, Korea

A topological dynamical system (X, T) is called topologically transitive if it has a dense forward orbit. In many cases T is not topologically transitive, hence a $T-$invariant closed subset Y of X, together with the restriction of T, is called a (topologically transitive) component of (X, T) if (Y, T) is a maximal topologically transitive subsystem of (X, T). As the number of the subspaces of a topological dynamical system is at most cardinality of continuum, it is natural to ask whether there is a topological dynamical system with uncountably many topologically transitive components. After developing some machinery, we present a class of expansive Cantor homeomorphisms (subshifts) with uncountably many topologically transitive components.

D2: Lightening the assumption for Pontryagin principles in infinite horizon and discrete time

Ngo Thoi Nhan

University Paris 1 Pantheon Sorbonne and Hue College of Economics

In the infinite-horizon and discrete-time framework, there are many existing results on maximum principles of Pontryagin for optimal control problems with dynamical system governed by a difference equation or a difference inequation. The general method is to translate the optimal control problem into a static optimization problem, then use an appropriate multiplier rule for such problem. However, many existing multiplier rules require the Lipschitzian conditions to use Clarkes calculus, while others require the smoothness or at least, the Fréchet differentiability and the continuity on a neighborhood of the optimal solution of the functions issued in the problem. Besides, for the optimal control problems in the presence of constraints for the input controls, the linear independence of the differentials of the functions in these constraints was used to assure that the multipliers with respect to the criterion and the dynamical system are not simultaneously zero. In this work, we establish maximum principles of Pontryagin under assumptions, which are weaker than those of existing results by avoiding several assumptions of continuity, of Fréchet differentiability and of linear independence.

D3: Decomposition of factor codes

Jisang Yoo

Seoul National University, Korea

It is well known that equilibrium states (e.g. measure of maximal entropy, g-measures) on mixing subshifts of finite type are unique as long as the potential function is sufficiently regular. We study generalizations of this result relative to factor maps. We prove and apply a new structure result for factor maps between symbolic dynamical systems to analyze relative equilibrium states. This enables us to give a positive answer to an open problem posed by M. Boyle and K. Petersen: are measures of maximal relative entropy over any Markov measure unique?

D4: Weak expansive measures for flows

Nguyen Ngoc Thach

Chungnam National University, Korea

Recently, Carrasco-Olivera and Morales extended a concept of expansive measure from homeomorphisms to flows by using Borel orbit-vanishing measures, and proved that there were no measure-expansive flows on closed surfaces. In this talk, we introduce a concept of weak expansive measure for flows which is really weaker than that of expansive measure, and show that there is a weak measure-expansive flow on a closed surface. Moreover, we prove that for any flow ϕ on a compact metric space X, the set of ϕ-orbit-vanishing measures is dense in the set of all Borel probability measures on X with weak*-topology. The result is applied to characterize the set of weak measure-expansive flows using the notion of countably expansive flows.

This is a joint work with K. Lee.

D5: Hyperbolicity of a type of limit shadowing

Junmi Park

Mokwon University, Korea

In 2013, it is introduced the exponential limit shadowing property and showed that Ω-stability implies the exponential limit shadowing property. In this talk, we study the relation between the exponential limit shadowing property and hyperbolic structure of a system. More precisely, let M be a compact smooth manifold with a metric d and let $f : M \to M$ be a diffeomorphism. We show that if f is in the C^1 interior of the set of diffeomorphisms satisfying the exponential limit shadowing property

then it is Anosov. Moreover, C^1 generically, f has the exponential limit shadowing property then it is Anosov. This is a joint work with Manseob Lee.

D6: Transitive sets of discrete dynamical systems

Seunghee Lee

National Institute for Mathematical Sciences, Korea

Let f be a diffeomorphism of a compact C^∞ manifold M, and let $\Lambda \subset M$ be a transitive set of f. In this talk, we prove that if a diffeomorphism f belongs to the C^1 interior of the set of Λ-topologically stable diffeomorphisms then Λ is hyperbolic.

D7: Entropy of continuous maps with shadowing properties

Bowon Kang

Chungnam National University Korea

Shadowing properties was developed intensively in recent years and became a significant part of the qualitative theory of dynamical systems containing a lot of interesting results. Blank introduced the notion of average shadowing property and proved that certain kinds of perturbed hyperbolic systems have the average shadowing property. In this talk, we introduce the notion of strong average shadowing property in continuous maps and discuss some relations between the entropy and strong average shadowing property.

This is a joint work with Hyunhee Lee.

D8: Converse Lyapunov theorems via impulsive variational systems

Namjip Koo

Chungnam National University, Korea

In this talk we develop useful relations which estimate the difference between the solutions of nonlinear impulsive differential equations with different initial values. Then we obtain converse Lyapunov theorems of Massera's type for the nonlinear impulsive equations by employing the t_∞-similarity of the associated impulsive variational equations and relations.

This is a joint work with Sung Kyu Choi.

D9: Shadowing properties in the Julia set of one dimensional expanding maps

Young Woo Nam

Hongik University, Korea

The Julia set of rational map f on the Riemann sphere is a compact and completely invariant set under f. An expanding map on the neighborhood of Julia set on the Riemann sphere is called hyperbolic map. In this talk, we see that if f is hyperbolic on the Julia set, then it has various shadowing properties according to the results of the shadowing of non invertible maps on the compact metric space. Later, we see that some non-hyperbolic rational maps which have shadowing property in the Julia set. Some open problems and further topics would be suggested.

D10: Lifting problem for commuting subnormals

Sang Hoon Lee

Chungnam National University, Korea

The Lifting Problem for Commuting Subnormals (LPCS) asks for necessary and sufficient conditions for a pair of subnormal operators on a Hilbert space to admit commuting normal extensions. This is an old problem in operator theory. There are many known examples of commuting pairs of subnormal operators which admit no lifting. Also many sufficient conditions for the existence of a lifting have been found. In 1978, A. Lubin addressed a concrete problem about the LPCS: Does the subnormality for the sum of commuting subnormal operators guarantee the existence of commuting normal extensions? In this talk we give an answer to this question.

It is a joint work with W. Y. Lee and J. Yoon.

D11: Measure expansiveness of Semi-flows with positive entropy

Jumi Oh

Sungkyunkwan University, Korea

In this talk, we study the measure expansiveness of semi-flows on a compact metric space which has positive measure-theoretical entropy.

D12: Measure-preservation criteria for a certain class of 1-Lipschitz functions on $\mathbb{Z}_p$ in Mahler's expansion

Sangtae Jeong

Inha University, Korea

In this talk, we formulate a conjecture for measure-preservation criteria of 1-Lipschitz functions defined on the ring $\mathbb{Z}p$ of p-adic integers in terms of Mahler's expansion. We then provide evidence for this conjecture when $p = 3$, and verify that it also holds for a wider class of 1-Lipschitz functions that are everywhere differentiable on $\mathbb{Z}_p$, which we call $\mathbb{B}$-functions in the sense of Anashin.

This is a joint work with Chunlan Li.

D13: Transformatio of Gibbs measures

Soonjo Hong

National Institute for Mathematical Sciences, Korea

Gibbs states in thermodynamics are expressed as Gibbs measures on shift spaces. We apply the study of the transition classes of factor maps to investigate how Gibbs properties are lost and preserved under factor maps from shifts of finite type.

D14: Partner orbits and action differences on compact factors of the hyperbolic plane

Huynh Minh Hien

Quy Nhon University, Vietnam

In this report, we consider the geodesic flow on compact factors of the hyperbolic plane. We present the existence of the periodic partner orbit for a given periodic orbit with a small-angle self-crossing in configuration space and an estimate for the action difference between the orbit pair. An inductive argument to deal with higher-order encounters is also introduced.

D15: Topological stability of expansive measures

Jiweon Ahn

Chungnam National University, Korea

In this talk, we extend the concepts of shadowable measure and topological stable measure from homeomorphisms to flows, and prove that any expansive measure with shadowing property is topological stable for flows.

D16: The linear differential equations with complex constant coefficients and Schroedinger equations

Soon-Mo Jung

Hongik University, Korea

We investigate some properties of approximate solutions for the second-order inhomogeneous linear differential equations, $y''(x)+\alpha y'(x)+\beta y(x) = r(x)$, with complex constant coefficients. Moreover, as an application of our results, we will prove the Hyers-Ulam stability of the time independent Schroedinger equations.

D17: Dynamics of β-transformations and unique expansions over ternary alphabets

DoYong Kwon

Chonnam National University, Korea

Let $\beta > 1$ and A be a finite alphabet of real numbers. After investigating dynamics of β-transformations, unique expansions over A in base β are considered. A real number G_A called the generalized golden ratio is a border of situation of unique expansions. If $\beta < G_A$ then there are only trivial unique expansions in base β, while we have non-trivial unique expansions in base β whenever $\beta > G_A$. For a given alphabet $A = \{a_1, a_2, a_3\}$ with $a_1 < a_2 < a_3$, we give a complete characterization of the generalized golden ratio G_A effectively and algorithmically.

D18: Invariant manifolds for dynamic systems with dominated splitting

Le Huy Tien

Hanoi University of Science, VNU

On time scale with bounded graininess, we prove the existence and smoothness of invariant manifolds for linear dynamic systems with dominated splitting.

D19: Lyapunov stable homoclinic classes with shadowing for flows

Manseob Lee

Mokwon University, Korea

Let M be a closed smooth manifold with $\dim M \geq 3$ and let d be the distance on M induced from a Riemannian metric $\|\cdot\|$ on the tangent bundle TM, and denote by $\mathfrak{X}(M)$ the set of C^1-vector fields on M endowed with the C^1-topology. Then every $X \in \mathfrak{X}(M)$ generates a C^1-flow $X_t : M \times \mathbb{R} \to M$. In this talks, we show that for C^1 generic $X \in \mathfrak{X}(M)$, if a bi-Lyapunov stable homoclinic class $H_X(\gamma)$ is shadowing then $H_X(\gamma) \cap Sing(X) = \emptyset$ and $H_X(\gamma)$ is hyperbolic, for some hyperbolic periodic orbit γ. Moreover, if a bi-Lyapunov stable homoclinic class $H_X(\gamma)$ is homogeneous then it is hyperbolic.

D20: Bohl-Perron type stability theorems for linear singular difference equations

Ngo Thi Thanh Nga

Thang Long University, Vietnam

In this report, we analyze the solution properties of linear singular system of difference equations of the form

$$E_n y(n+1) = A_n y(n) + q_n, \qquad n \in N, n \geq n_0, \tag{1}$$

where E_n, A_n are real or complex matrices of size $d \times d$, q_n are d-dimensional vectors, n_0 is a given integer.

The homogeneous system associated with (1) is

$$E_n x(n+1) = A_n x(n), \qquad n \in N, n \geq n_0. \tag{2}$$

We aim to extend Bohl-Perron type theorems which are well known in the theory of ordinary differential equations and difference equations to singular difference equations. Namely, we characterize the relation between the exponential stability (uni-

form stability) of homogeneous equation (2) and the solution properties of nonhomogenous equation (1).

Joint work with Vu Hoang Linh.

D21: Shadowing and Inverse shadowing in Group actions

Sang Jin Kim

Chungnam National University, Korea

Recently, Sergei Pilyugin extended a concept of inverse shadowing from homeomorphisms to group actions, and prove a reductive inverse shadowing theorem by using the tube condition which replaces the notion of topologically Anosov action. In this talk, we show that any finitely generated group action on a compact manifold has the inverse shadowing property if it is topologically stable, but the converse is not true in general. Moreover we investigate some relationship between continuous shadowing and continuous inverse shadowing in group actions.

This is a joint work with Meihua Dong.

D22: On the topological entropy of nonautonomous systems

Le Duc Nhien

Hanoi University of Science, VNU

We extend the concept topological entropy to nonautonomous linear systems. Next, we give an estimation of the topological entropy for the class of bounded linear equation in finite dimensional dimension. Finally, we investigate the invariant properties of the topological entropy under transformations such as topological conjugacy, topological equivalence and kinematically similar.

This is a joint work with Le Huy Tien.

D23: Classification of asymptotic behavior of the stochastic SIR epidemic models

Nguyen Thanh Dieu

Vinh University, Vietnam

In this talk we derive asymptotic behavior of the stochastic SIR epidemic systems. We give sufficient conditions that are very close to the necessary conditions for the permanence. In addition, on develops ergodicity of the underlying system by

characterizing the support of a unique invariant probability measure. It is proved that the transition probabilities converge in total variation norm to the invariant measure. Our result gives a precise characterization of the support of the invariant set. Rates of convergence are also ascertained. It is shown that the rate is not too far from the exponential in that the convergence speed is of the form of a polynomial of any order.

This is a joint work with N. H. Du, N. H. Dang and G. Yin.

D24: Numerical solution for a class of structured strangeness-free differential-algebraic equations by linear multistep methods

Nguyen Duy Truong

Tran Quoc Tuan University, Vietnam

It is known that when we apply a linear multistep method to nonlinear strangeness-free differential-algebraic equations (DAEs), the strict stability of the second characteristic polynomial is required for the method stability. In this report we present and analyze implicit and half-explicit linear multistep methods for a class of structured strangeness-free DAEs. By applying the methods to reformulated DAEs, the methods have the same convergent order and stability property as applied to ordinary differential equations. That is, the strict stability of the second characteristic polynomial is relaxed. Numerical experiments are given to confirm the theoretical results.

Joint work with Vu Hoang Linh.

D25: Stochastic dynamic delay equation on time scale

Le Anh Tuan

Ha Noi University of Industry, Vietnam

The stochastic differential/difference delay equations have come to play an important role in describing the evolution of eco-systems in random environment, in which the future state depends not only on the present state but also on its history. Therefore, their qualitative and quantitative properties have received much attention from many research.

In order to unify the theory of differential and difference equations into a single set-up, the theory of analysis on time scales has received much attention from many research groups. While the deterministic dynamic equations on time scales have been investigated for a long history, as far as we know,we can only refer to very few papers: M. Bohner, O. M. Stanzhytskyi and A. O. Bratochkina, with Stochastic dynamic equations on general time scales; N. H. Du and N. T. Dieu, with Stochastic

dynamic equation on time scale; N. H. Du, N. T. Dieu, L. A. Tuan, with Exponential P-stability of stochastic -dynamic equations on disconnected sets, which contributed to the stochastic dynamics on time scales. Moreover, there is no work dealing with the stochastic dynamic delay equations.

Motivated by the aforementioned reasons, the aim of this paper is to consider the existence, uniqueness and uniformly exponential p-stability of the solution for stochastic dynamic delay equations on time scales. This work can be considered as a unification and generalization of stochastic difference and stochastic differential delay equations.

O: Optimization

O1: On robust semi-infinite multiobjective optimization problems

Gue Myung Lee

Pukyong National University, Korea

In this talk, we consider a semi-infinite multiobjective optimization problem with more than two differentiable objective functions and uncertain constraint functions, which is called a robust semi-infinite multiobjective optimization problem and give its robust counterpart (RSIMP) of the problem, which is regarded as the worst case of the uncertain semi-infinite multiobjective optimization problem. We prove a necessary optimality theorem for a weakly robust efficient solution of (RSIMP), and then give a sufficient optimality theorem for a weakly robust efficient solution of (RSIMP). We formulate a Wolfe type dual problem of (RSIMP) and give duality results which hold between (RSIMP) and its dual problem.

O2: Rank-one solutions to systems of linear matrix equations and application to filter design problem

Le Thanh Hieu

Quy Nhon University, Vietnam

This talk aims at presenting some necessary conditions and sufficient conditions for the existence of rank-one solutions to general systems of linear matrix equations. Conditions for the existence of low-rank solutions to such systems are also derived by using the facts on rank-one solutions.

A numerical method for solving such a system is based on the generalized Levenberg Marquardt method for solving the least squares problem. This method is then applied to solve a low pass filter design problem as an illustration of such rank-one solutions.

O3: On the stability and solution sensitivity of a consumer problem

Vu Thi Huong

Institute of Mathematics, VAST

Various stability properties and a result on solution sensitivity of a consumer problem are obtained in this paper. Focusing on some nice features of the budget map, we are

able to establish the continuity and the locally Lipschitz continuity of the indirect utility function, as well as the Lipschitz-Hölder continuity of the demand map under a minimal set of assumptions. The recent work of Penot [J. Nonlinear Convex Anal. 15 (2014), 1071–1085] is our starting point, while an implicit function theorem of Borwein [J. Optim. Theory Appl. 48 (1986), 9–52] and a theorem of Yen [Applied Math. Optim. 31 (1995), 245–255] on solution sensitivity of parametric variational inequalities are the main tools in our proofs.

Keywords: Consumer problem, producer problem, budget map, indirect utility function, demand map, continuity, Lipschitz-Hölder continuity.

Joint work with J.-C. Yao and N. D. Yen.

O4: Linear and nonlinear metric regularity and optimality conditions

Phan Quoc Khanh

International University, VNU-HCM

We propose a general nonlinear model of regularity including a functional regularity modulus instead of a linear modulas and a distance-like instead of a metric. Sufficient conditions for this regularity property are established based on the induction theorem instead of the Ekeland variational principle (EVP) used in most of the recent contributions to the topic. Moreover, the equivalence of our induction theorem and the EVP is proved. Next, we apply this general nonregularity condition to obtain nonclassical Karuch-Kuhn-Tucker (KKT) optimality conditions in nonsmooth optimization. Imposing the special case of directional Holder metric subregularity and using the Studniarski derivative we get higher orders of such KKT conditions. Moreover, assuming directional linear metric subregularity and using contingent-type derivatives we demonstrate nonclassical higher-order KKT conditions with additional complementarity slackness.

O5: Balancing domain decomposition by constraints and perturbation

Nguyen Trung Hieu

Duy Tan University, Vietnam

In this talk, we present a perturbed formulation of the BDDC method. We prove that the perturbed BDDC has the same polylogarithmic bound for the condition number as the standard formulation. Two types of properly scaled zero-order perturbations are considered: one uses a mass matrix and the other uses a Robin-type boundary condition, i.e, a mass matrix on the interface. With perturbation, the well-posedness of the local Neumann problems and the global coarse problem is automatically guaranteed and coarse degrees of freedom can be defined only for convergence purposes

but not well-posedness. This allows a much simpler implementation as no complicated corner selection algorithm is needed. Minimal coarse spaces using only face or edge constraints can also be considered. They are very useful in extreme scale calculations where the coarse problem is usually the bottleneck that can jeopardize scalability. The perturbation also adds extra robustness as the perturbed formulation works even when the constraints fail to eliminate a small number of subdomain rigid body modes from the standard BDDC space. This is extremely important when solving problems on unstructured meshes partitioned by automatic graph partitioners since arbitrary disconnected subdomains are possible. Numerical results are provided to support the theoretical findings..

O6: Inverse problems with nonnegative and sparse solutions: Algorithms and application to phase retrieve problem

Pham Quy Muoi

University of Education, The University of Danang, Vietnam

In this paper, we study the gradient-type method and the semismooth Newton method for minimization problems in regularization of inverse problems with nonnegative and sparse solutions. We propose a special penalty functional, which makes regularized minimization problems having nonnegative and sparse minimizers and then applied the algorithms for solving the problem. Here, the strongly convergence of the gradient-type method and the local superlinear convergence of the semismooth Newton method are proved. Then, we use these algorithms for phase retrieve problem. Finally, we illustrate the efficiency of the algorithms for phase retrieve problem by a numerical example.

Joint work with Dinh Nho Hào, Cuong Dang and Dongliang.

O7: Minimal time function associated with a collection of sets in normed spaces

Nguyen Van Luong

Hong Duc University, Vietnam

In this talk, I will first introduce the concept of minimal time function associated with a collection of sets in normed spaces. I then present various properties of this function: lower semicontinuity, convexity, Lipschitzianity, and subdifferential calculus.

O8: Incremental gradient method forr Karcher mean on symmetric cones

Sangho Kum

Chungbuk National University, Korea

We deal with the minimization problem for computing Karcher mean on a symmetric cone. The objective of this minimization problem consists of the sum of squares of the Riemannian distances with many given points in a symmetric cone. Moreover, the problem can be reduced to a bound constrained minimization problem. These motivate us to adapt an incremental gradient method. So we propose an incremental gradient method and establish its global convergence properties exploiting the Lipschitz continuity of the gradient of the Riemannian distance function.

O9: Quasinonexpansive mappings involving pseudomonotone bifunctions

Le Dung Muu

Institute of Mathematics, VAST

We present new quasi-nonexpansive mappings involving pseudomonotone bifunctions defined on convex sets in real Hilbert space. We investigate some properties concerning their fixed point sets. Some applications to equilibrium problems are discussed.

O10: Extragradient-proximal methods for split equilibrium and fixed point problems in Hilbert spaces

Bui Van Dinh

Le Quy Don Technical University, Vietnam

In this talk, we present two new extragradient-proximal algorithms for solving split equilibrium and fixed point problems (SEFPP) in real Hilbert spaces in which the first equilibrium bifunction is pseudomonotone, the second one is monotone and the fixed point mappings are nonexpansive. By using the extragradient method incorporated with the proximal point algorithm and cutting techniques, we obtain algorithms for solving (SEFPP). Under certain conditions on parameters, the iteration sequences generated by the proposed algorithms are proved to be weakly and strongly convergent to a solution of (SEFPP). Our results improve and extend the previous results given in the literature.

Keywords. Split equilibrium problem; Split fixed point problem Nonexpansive mapping; Weak and strong convergence; Pseudomonotonicity

Joint work with Dang Xuan Son and Tran Viet Anh.

O11: Some results about error bounds and weak sharp minima in the vector case

Truong Xuan Duc Ha

Institute of Mathematics, VAST

The concepts of error bounds and weak sharp minima play an important role in optimality conditions, subdifferential calculus, stability and convergence of numerical methods. Numerous characterizations of the error bound property have been established in terms of various derivative-like objects either in the primal space (directional derivatives, slopes,etc) or in the dual space (subdifferentials, normal cones). In this talk, we present some results about slope, error bounds and weak sharp minima in the vector case.

O12: Quasi-equilibrium problems and fixed point theorems of the sum of lower and upper semicontinuous mappings

Nguyen Xuan Tan

Institute of Mathematics, VAST

We first formulate generalized quasi-equilibrium problems concerning multivalued mappings and give some sufficient conditions to the existence of their solutions. In particular, we establish several results on the existence of solutions to fixed points of the sum of l.s.c and u.s.c mappings. These generalize some well-known fixed point theorems obtained by previous authors as Ky Fan, F. E. Browder and Ky Fan, X. Wu, L. J. Lin, and Z. T. Yu etc. Lastly, we apply the obtained results to quasi-equilibrium problems of types I, II and mixed quasi-equilibrium problems of these two types.

O13: New criteria for robust finite-time stabilization of linear singular systems with interval time-varying delay

Nguyen Huyen Muoi

Institute of Mathematics, VAST

Finite-time stabilization involves finding state feedback controllers which robustly stabilize the closed-loop system in the finite-time sense. This paper deals with robust finite-time stabilization of linear singular systems with interval time-varying delay.

Based on the singular value decomposition method and using an extended Jensen inequality lemma, we provide new sufficient conditions for robust finite-time stabilization. The proposed conditions expressed in terms of linear matrix inequalities allow us to construct state feedback controllers which robustly finite-time stabilize the closed-loop system. A numerical example is given to illustrate the efficiency of the proposed methods.

O14: Convergence analysis of a proximal point algorithm for minimizing differences of functions

Nguyen Thai An

Thua Thien Hue College of Education, Vietnam

Several optimization schemes have been known for convex optimization problems. However, numerical algorithms for solving nonconvex optimization problems are still underdeveloped. A significant progress to go beyond convexity was made by considering the class of functions representable as differences of convex functions. In this talk, we introduce a generalized proximal point algorithm to minimize the difference of a nonconvex function and a convex function. We also present convergence results of this algorithm under the main assumption that the objective function satisfies the Kurdyka ojasiewicz property.

O15: Strong second-order Karush-Kuhn-Tucker optimality vonditions for vector optimization

Nguyen Van Tuyen

Hanoi Pedagogical University No. 2, Vietnam

This talk focuses on vector optimization problems with constraints, where objective functions and constrained functions are Fréchet differentiable, and whose gradient mapping is locally Lipschitz on an open set. By using the second-order symmetric subdifferential and the second-order tangent set, we introduce two new types of the Abadie second-order regularity conditions. Then we establish some strong second-order Karush-Kuhn-Tucker necessary optimality conditions for a Geoffrion properly (an) efficient solution to this problem. Examples are given to illustrate the obtained results.

O16: Affine variational inequalities on normed spaces

Nguyen Dong Yen

Institute of Mathematics, VAST

In this talk we study infinite-dimensional affine variational inequalities (AVIs) on normed spaces. It is shown that infinite-dimensional quadratic programming problems and infinite-dimensional linear fractional vector optimization problems can be studied by using AVIs. We present two basic facts about infinite-dimensional AVIs: the Lagrange multiplier rule and the solution set decomposition.

Joint work with Xiaoqi Yang.

Keywords and Phrases: Infinite-dimensional affine variational inequality, Infinite-dimensional quadratic programming, Infinite-dimensional linear fractional vector optimization, Generalized polyhedral convex set, Solution set.

Related Topics: Variational Analysis, Optimization Theory.

O17: Solution existence for quadratic programs in Banach spaces

Nguyen Nang Tam

Hanoi Pedagogical University 2, Vietnam

In this talk we discuss quadratic programs in Banach spaces and propose sufficient conditions for the solution existence of convex quadratic programs under finitely many convex quadratic constraint in reflexive Banach spaces

Key words. quadratic program in Banach spaces, solution existence, Legendre form, recession cone.

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O18: Sensitivity analysis of an optimization problem under nonlinear perturbations

Duong Thi Kim Huyen

IMH, VAST

We analyze the stability of the Karush-Kuhn-Tucker (KKT) point set map of a C^2-smooth parametric optimization problem with one C^2-smooth functional constraint under nonlinear perturbations by using a coderivative analysis of composite constraint functions of Levy and Mordukhovich [*Math. Program.,* 99 (2004), pp. 311–327] and several related results. We not only give necessary and sufficient conditions for the local Lipschitz-like property of the KKT point set map, but also sufficient conditions for its Robinson stability. The obtained results lead us to new insights into the preceding deep results of Levy and Mordukhovich and of Qui [*J. Optim. Theory Appl.,* 161 (2014), pp. 398–429; *J. Glob. Optim.,* 65 (2016), pp. 615–635].

Joint work with Jen-Chih Yao and Nguyen Dong Yen.

O19: Differential stability of a class of convex optimal control problems

Duong Thi Viet An

College of Sciences, Thai Nguyen University, Vietnam

A parametric constrained convex optimal control problem, where the initial state is perturbed and the linear state equation contains a noise, is considered in this paper. Formulas for computing the subdifferential and the singular subdifferential of the optimal value function at a given parameter are obtained by means of some recent results on differential stability in mathematical programming. The computation procedures and illustrative examples are presented.

Joint work with J.-C. Yao and N. D. Yen.

O20: Mann-extragradient method for unrelated variational inequalities and fixed point problems

Pham Ngoc Anh

Post and Telecommunications Institute of Technology, Vietnam

In this paper we propose a new hybrid variant of Mann and extragradient iteration methods for finding a common solution of a system of unrelated variational inequalities and fixed point problems corresponding to different feasible domains in a real Hilbert space. We present an algorithmic scheme that combine the idea of the ex-

tragradient method and the Mann iteration method as a hybrid variant. Then, the iterative point is modified by projecting a given initial point on intersect of suitable convex sets to get a strong convergence property under certain assumptions by suitable choice parameters. Finally, a numerical example is developed to illustrate the behavior of the new algorithm with respect to existing algorithm.

O21: On the existence of Pareto solutions for semi-algebraic vector optimization problems

Pham Tien Son

University of Dalat, Vietnam

We are interested in the existence of Pareto solutions to the vector optimization problem

$$\mathrm{Min}_{\mathbb{R}^m_+}\{f(x) \,|\, x \in \mathbb{R}^n\},$$

where $f\colon \mathbb{R}^n \to \mathbb{R}^m$ be a C^1 semi-algebraic map. By using the so-called *tangency variety* of f we first construct a semi-algebraic set of dimension at most $m-1$ containing the set of Pareto values of the problem. Then we establish connections between Palais–Smale conditions, M-tameness, and properness for the map f. Based on these results, we provide some sufficient conditions for the existence of Pareto solutions of the problem. We also introduce a generic class of polynomial vector optimization problems, which have at least one Pareto solution.

This is a joint work with Do Sang Kim and Nguyen Van Tuyen.

O22: Nonconvex quadratic program over a generalized second-order cone and linear equalities

Nguyen Van Bong

Tay Nguyen University, Vietnam

In this talk we present a solution method for a generalized trust region subproblem over a generalized second-order cone with linear equality constraints. The problem will first be reduced to a quadratic program over one quadratic constraint (QP1QC) with lower dimension. The semidefinite relaxation technique together with the matrix rank-one decomposition procedure will then be applied to propose an algorithm for solving the resulting QP1QC. Optimal solutions of the original problem are then recovered from the solutions of the resulting QP1QC. Necessary and sufficient conditions on the boundedness and attainment will also be presented.

O23: On solution mapping of equilibrium problems

Tran Thi Hoang Anh

Hai Phong University, Vietnam

In this paper, we consider the solution mapping of equilibrium problems in a real Hilbert space, where the cost bifunction is convex forward to the second variable. By using the property that a point belongs to the solution set of the equilibrium problems if and only if it is a fixed point of the solution mapping, we obtain the contractiveness, nonexpansiveness and strictly pseudo-contractiveness of the solution mapping under some monotone assumptions of the bifunctions.

O24: Optimality conditions for nonsmooth vector problems in normed space via generalized Hadamard directional derivatives

Phan Nhat Tinh

University of Hue, Faculty of Sciences, Vietnam

By introducing the concepts of generalized Hadamard directional derivatives, we establish first and second order optimality conditions for nonsmooth vector problems with set constraint in normed spaces. Our results generalize, sharpen and strengthen some recent known ones. Illustrative numerical examples are also given.

O25: Optimal control of the 3D Navier-Stokes-Voigt equations

Tran Minh Nguyet

Thang Long University, Vietnam

We consider an optimal control problem for the 3D Navier-Stokes- Voigt equations in bounded domains, where the time needed to reach a desired state plays an essential role. We first prove the existence of optimal solutions, and then establish the first-order necessary optimality conditions, and the second-order sufficient optimality conditions.

P: Ordinary and Partial Differential Equations

P1: Classification of string solutions for the self-dual Einstein-Maxwell-Higgs model

Jongmin Han

Kyung Hee University, Seoul

In this talk, we are concerned with an elliptic system arising from the Einstein-Maxwell-Higgs model which describes electromagnetic dynamics coupled with gravitational fields in space-time. Reducing this system to a single equation and setting up the radial ansatz, we classify solutions into three cases: topological solutions, nontopological solutions of type I, and nontopological solutions of type II. There are two important constants: $a > 0$ representing the gravitational constant and $N \geq 0$ representing the total vortex number. When $0 \leq aN < 2$, we give a complete classification of all possible solutions and prove the uniqueness of solutions to a given decay rate. We also prove the multiple existence of solutions to a given decay rate for the case $aN \geq 2$. These improve previously known results.

P2: An optimal control problem of the 3D viscous Camassa-Holm equations

Dang Thanh Son

Telecommunications University, Vietnam

In this paper we study an optimal control problem of the three-dimensional viscous Camassa-Holm equations in bounded domains. We prove the existence of optimal solutions and then establish the first-order necessary and second-order sufficient optimality conditions. This is a joint work with Cung The Anh.

P3: The infinite differentiability of the speed for excited random walks

Pham Cong Dan

Duy Tan university, Vietnam

In this talk, we represent the excited random walks (ERW). Some open questions on the monotonicity and regularity of the speed of ERWs are discussed. We prove that the speed of the excited random walk is infinitely differentiable with respect to the bias parameter in $(0, 1)$ for the dimension $d \geq 2$.

P4: Data assimilation in heat conduction

Nguyen Thi Ngoc Oanh

College of Science, Thainguyen University, Vietnam

We study the problems of reconstructing the initial condition in parabolic equations from the observation at the final time, from interior integral observations, and from boundary observations. We reformulate these inverse problems as variational problems of minimizing appropriate misfit functionals. We prove that these functionals are Fréchet differentiable and derive a formula for their gradient via adjoint problems. The direct problems are first discretized in space variables by the finite difference method and the variational problems are correspondingly discretized. To solve the problems numerically, we further discretize them in time by the splitting method. It is proved that the completely discretized functionals are Fréchet differentiable and the formulas for their gradient are derived via discrete adjoint problems. The problems are then solved by the conjugate gradient method and tested on computer. As a by-product of the variational method based on Lanczos algorithm, we suggest a simple method to approximate the degree of ill-posedness.

This is a joint work with Dinh Nho Hao.

P5: Pullback attractor for differential evolution inclusions with delays.

Nguyen Van Dac

Thuy Loi University, Vietnam

In this talk, we will analyze the existence of pullback attractor for non-autonomous differential inclusions with delays in Banach spaces by using measures of noncompactness. The obtained results can be applied to control systems driven by semilinear partial differential equations and multivalued feedbacks.

This is a joint work with Tran Dinh Ke.

P6: Some results relating to limit theorems for extended random summation of $m-$dependent random variables

Le Truong Giang

University of Finance and Marketing, Vietnam

In this note, using the moving average technique, the weak laws of large numbers for random sums of stationary m-dependent random variables are established with the rate of convergence.

Joint work with Tran Loc Hung and Nguyen Tan Nhut.

P7: Ellipsoidal BGK model for polyatomic particles

Seok-Bae Yun

Sungkyunkwan University

In this talk, we present our recent results on the polyatomic ellipsoidal BGK model, which is a relaxation type kinetic model describing the time evolution of phase space distribution of polyatomic particles.

P8: Determination of a term in right-hand side of parabolic equations

Bui Viet Huong

College of Science, Thainguyen University, Vietnam

The inverse problem of determining a term in the right hand side of parabolic equations from integral observations is investigated. The observations can be regarded as generalized interior point observations which are collected in practice. The problem is then reformulated as a least squares problem in coupling with a Tikhonov regularization term. It is proved that the Tikhonov functional is Fréchet differentiable and a formula for the gradient is derived via an adjoint problem. The variational problem is discretized by the finite element method, the convergence of which is proved. The discretized variational problem is numerically solved by the conjugate gradient method. Some numerical examples are presented for showing the efficiency of the method.

P9: Function spaces for the incompressible flows

Jaiok Roh

Hallym University, Korea

The function spaces for the incompressible flows are very important. In this talk, we will see the interesting properties for the function spaces we will use for the incompressible flows in different physical domains.

P10: Decay rates of solutions to some α-models in fluid mechanics

Cung The Anh

Hanoi National University of Education

We present recent results on time decay rates of solutions to some alpha-models in fluid mechanics, including Navier-Stokes-Voigt equations, Navier-Stokes-alpha equations and some MHD-alpha models on the whole space. By combining the recent theory of decay characterization of Bjorland-Niche-Schonbek, the Fourier Splitting Method introduced by Schonbek and inductive arguments, we get both upper and lower bounds of time decay rates of the solutions in Sobolev spaces and the results obtained seem to be optimal in many cases. This is a joint work with Pham Thi Trang.

P11: The cone property of parabolic partial differential equations

Minkyu Kwak

Chonnam National University, Korea

The cone property is essential in the proof of existence of an inertial manifold. We discuss this property and some extension to a certain class of parabolic equation with gradient in nonlinearity term.

P12: Note on a difference between the approximate solution and accurate solution to SDDE

Young-Ho Kim

Changwon National University, Korea

In this talk, we introduce some basic examples for differential delay equation and stochastic differential equation relevant to this topic. Also we deal with some difference or convergence theorem for some approximate solutions of the stochastic differential delay equation and apply these results to some asymptotic behavior of the solution of the delay equation.

P13: Vortex Patches of Serfati

Hantaek Bae

Ulsan National Institute of Science and Technology (UNIST)

In 1993, two proofs of the persistence of regularity of the boundary of a classical vortex patch for the 2D Euler equations were published, one by Chemin and the other by Bertozzi-Constantin. In fact, Chemin proved a more general result, showing that vorticity initially having discontinuities only in directions normal to a family of vector fields continue to be so characterized by the time-evolved vector fields. A different four-page elementary proof of the regularity of a vortex patch boundary was published in 1994 by Serfati, employing only one vector field to describe the discontinuities in the initial data. In this talk, we discuss Serfati's proof along with a natural extension of it to a family of vector fields that reproduces the 1995 result of Chemin.

P14: Spectral monodromy of small non-selfadjoint perturbations of nearly integrable Hamiltonians

Phan Quang Sang

Vietnam National University of Agriculture

We work with small non-selfadjoint perturbations of a selfadjoint quantum Hamiltonian with two degrees of freedom, assuming that the principal symbol of the selfadjoint part is (classically) a nearly integrable system, together with a globally non-degenerate condition. We define a monodromy directly from the spectrum of such an operator, in the semiclassical limit. Moreover, this spectral monodromy allows to detect the topological modifcation on the dynamics of the nearly integrable system. It can be identifed with the monodromy for KAM invariant tori of the nearly integrable system.

Keywords: Hamiltonian systems, non-selfadjoint, asymptotic spectral, pseudo-diferential operators, KAM theory.

P15: Lipschitz stability for inverse conductivity problem

Dang Anh Tuan

Hanoi University of Science, VNU

In a seminal paper A. P. Calderon considered the elliptic Dirichlet problem

$$div(\gamma \nabla u) = 0, \text{ in } \Omega, \tag{1}$$

$$u = \varphi, \text{ on } \partial\Omega, \tag{2}$$

where Ω is a bounded connected open set in $\mathbb{R}^n, n \geq 2$, the function γ (called conductivity) is bounded measurable and satisfies the ellipticity condition

$$0 < \lambda \leq \gamma \leq \lambda^{-1} \text{ a.e. in } \Omega,$$

for some positive $\lambda \in \mathbb{R}, \varphi \in H^{1/2}(\partial\Omega)$. There is a unique weak solution $u \in H^1(\Omega)$. The Dirichlet-Neumann (DN) map associated to the Dirichlet boundary value problem (1) - (2)

$$\Lambda_\gamma : H^{1/2}(\partial\Omega) \to H^{-1/2}(\partial\Omega),$$
$$\varphi \mapsto \gamma \nabla u \cdot \nu \Big|_{\partial\Omega},$$

where ν denotes the exterior unit normal to $\partial\Omega$. Calderon studied the inverse problem as follows: determining γ when Λ_γ is known.
In 1988 Alessandrini proved a logarithm stability theorem for the dimension $n \geq 3$. After a long time, in 2001, Madache showed that the logarithm stability is the best and Barcelo et. al. showed the logarithm stability in the plane. In 2005, Alessandrini and Vessella considered piecewise contant conductivities and proved a Lipschitz stability theorem for this case. Rondi showed the contant in the Lipschitz stability theorem grows exponentially with the number of domain. In 2011, Beretta and Francini showed the Lipschitz stability for complex piecewise constant conductivies. In 2014, Gaburro and Sincich showed the Lipschitz stability for anisotropic conductivities.
In this talk, we consider the case as Gaburro and Sincich did with a weaker assumption on anisotropic conductivities. Joint work with Nguyen Anh Tu.

P16: Mathematical Challenges of classical and quantum synchronization.

Seung Yeal Ha

Seoul National University, Korea

Synchronization of oscillators denotes a phenomenon for the adjustment of rhythms among weakly coupled oscillators, and one of collective modes appearing in oscillatory complex systems such as ensembles of Josepson junctions array, pacemaker

cells and reies etc. In this talk, I will briefly report the recent progress for synchronization and discuss some challenging open problems arising from synchronization via the Kuramoto and Lohe models.

P17: Polynomial decay of mild solutions to two-term time fractional differential equations

Vu Trong Luong

Tay Bac University, Vietnam

We present recent results on the existence of mild solutions with explicit decay rate of polynomial type for a class of two-term time fractional differential equations with nonlocal initial conditions.

P18: Feedback control of the 3D Navier-Stokes-α equations by finite determining parameters

Vu Manh Toi

Thuyloi University, Vietnam

We study the stabilization of solutions to the 3D Navier-Stokes-α equations by finite-dimensional feedback control scheme introduced recently by Azouani and Titi in [*Evol. Equ. Control Theory* 3 (2014), 579-594]. The designed feedback control scheme is based on the finite number of determining parameters (degrees of freedom), namely, finite number of determining Fourier modes, determining nodes, and determining finite volume elements. This is a joint work with Cung The Anh.