

**Veszprém Conference on  
Differential and Difference Equations  
and Applications**

**Program and Abstracts**

**Faculty of Information Technology  
University of Pannonia  
Veszprém, Hungary**

**July 2 – July 5, 2018  
Veszprém, Hungary**



**The conference is dedicated to**

**Professor István Győri**  
**University of Pannonia, Hungary**

**on the occasion of his 75<sup>th</sup> birthday**

**Organizing Committee:**

- Ferenc Hartung, University of Pannonia, Hungary (co-chair)
- Mihály Pituk, University of Pannonia, Hungary (co-chair)
- László Horváth, University of Pannonia
- Viktória Nagy, University of Pannonia, Hungary

**Conference venue:** Regional Centre of the Hungarian Academy of Sciences, Veszprém

**Acknowledgement:** The conference is partially supported by the Faculty of Information Technology, University of Pannonia, Hungary and the Regional Centre of the Hungarian Academy of Sciences, Veszprém.

## **List of participants**

- Tamasha Aldibekov, Al-Farabi Kazakh National Univesrity, Kazakhstan
- Chems Eddine Arroud, University of Jijel, Algeria
- Badreddine Azzouzi, Ecole Superieure de Management Tlemcen, Algeria
- Ferenc A. Bartha, University of Szeged, Hungary
- Jaromír Bařtinec, Brno University of Technology, Czech Republic
- Marina Bershadsky, Ariel University, Israel
- Gabriella Bognár, University of Miskolc, Hungary
- Maikel Bosschaert, Hasselt University, Belgium
- Pavel Brunovský, Comenius University, Slovakia
- Tomás Caraballo, Universidad de Sevilla, Spain
- Jan Čermák, Brno University of Technology, Czech Republic
- Szilvia Császár, Eötvös Loránd University, Hungary
- Josef Diblík, Brno University of Technology, Czech Republic
- Alexander Domoshnitsky, Ariel University, Israel
- Zuzana Dořlá, Masaryk University, Czech Republic
- János Dudás, Bolyai Institute, SZTE, Hungary
- István Faragó, Eötvös Loránd University, Hungary
- Teresa Faria, University of Lisbon, Portugal
- Marcia Federson, Universidade de São Paulo, Brazil
- Kōdai Fujimoto, Osaka Prefecture University, Japan
- Ábel Garab, Alpen-Adria Universität Klagenfurt, Austria
- John Graef, University of Tennessee at Chattanooga, United States
- David Greenhalgh, University of Strathclyde, Glasgow, UK
- István Győri, University of Pannonia, Hungary
- Yacine Halim, LMAM laboratory, Jijel University, Algeria
- Katalin Hangos, University of Pannonia, Hungary
- Ferenc Hartung, University of Pannonia, Hungary
- Younes Hooshmand Pour, Islamic Azad University of Rasht, Iran

- László Horváth, University of Pannonia, Hungary
- Zoltán Horváth, Széchenyi István University, Hungary
- Tamás Insperger, MTA-BME Lendület Human Balancing Research Group, Hungary
- Hyeonseong Jin, Jeju National University, South Korea
- Ahmad Kazemlou Sheikhi, Math teacher of Ministry of Education in Talesh city, Iran
- Benjamin Kennedy, Gettysburg College, USA
- HyeongJun Kim, Kunsan National University, Republic of Korea
- Sándor Kovács, Eötvös Loránd University, Hungary
- Tibor Krisztin, University of Szeged, Hungary
- Hyunseung Lee, Kunsan National University, Republic of Korea
- Minku Lee, Kunsan National University, Republic of Korea
- György Lipták, Hungarian Academy of Sciences Institute for Computer Science and Control, Hungary
- Tavakkol Maleki Lajayer, teacher of Ministry of Education in Talesh city, Iran
- Milan Medved', Comenius University, Bratislava, Slovakia
- Janusz Migda, Faculty of Mathematics and Computer Science, A. Mickiewicz University in Poznan, Poland
- Małgorzata Migda, Institute of Mathematics, Poznan University of Technology, Poland
- Iuliia Mizgireva, Ariel University, Israel
- Maria Guadalupe Morales Macias, Masaryk University, Czech Republic
- Éva Orbán-Mihálykó, University of Pannonia, Hungary
- Kenneth Palmer, National Taiwan University, Taiwan
- Jea-Hyun Park, Kunsan National University, Republic of Korea
- Zuzana Pátíková, Tomas Bata University in Zlín, Czech Republic
- Eugenia Petropoulou, University of Patras, Department of Civil Engineering, Greece
- Olga Pinhasov, Ariel University, Israel
- Mihály Pítuk, University of Pannonia, Hungary
- Mónika Polner, Bolyai Institute, University of Szeged, Hungary

- Christian Pötzsche, Alpen-Adria University Klagenfurt, Austria
- Vladimir Raichik, Ariel University, Israel
- Josef Rebenda, CEITEC BUT, Czech Republic
- David Reynolds, Dublin City University, Ireland
- Ali Rezaiguia, Mohamed Cherif Messaadia University, Algeria
- Gergely Röst, University of Oxford / University of Szeged, UK / Hungary
- Zulqurnain Sabir, Capital University of Science and Technology, Pakistan
- Ewa Schmeidel, University of Bialystok, Poland
- Călin C. Șerban, West University of Timisoara, Romania
- László Simon, Eötvös Loránd University, Hungary
- Péter Simon, Eötvös Loránd University, Hungary
- Antonín Slavík, Charles University, Czech Republic
- Gábor Stépán, Budapest University of Technology and Economics, Hungary
- Zdeněk Svoboda, FEEC BUT Brno, Czech Republic
- Gábor Szederkényi, Pázmány Péter Catholic University, Hungary
- Gabriella Vas, University of Szeged, Hungary
- Irina Volinsky, Ariel University, Israel
- Anett Vörös-Kiss, University of Szeged, Hungary
- Hans-Otto Walther, Universität Gießen, Germany
- Petr Zemánek, Masaryk University, Czech Republic
- Li Zhang, Nanjing University of Aeronautics and Astronautics, China

*Time tables*

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**Sunday, July 1**

16:00-19:00	<i>Registration at the conference venue</i>
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**Monday, July 2**

8:00-9:00	<i>Registration</i>		
9:00-9:15	<i>Opening Session</i>		
9:20-10:10	<b>Krisztin</b>		
10:15-10:45	<i>Coffee Break</i>		
10:45-11:15	<b>Palmer</b>		
11:20-11:50	<b>Caraballo</b>		
11:55-12:25	<b>P. Simon</b>		
12:30-14:00	<i>Lunch Break</i>		
14:00-14:30	<b>Faria</b>		
14:35-15:05	<b>Graef</b>		
15:10-15:40	<b>Bognár</b>		
15:45-16:15	<i>Coffee Break</i>		
16:15-16:45	<b>Röst</b>		
	<i>Session A</i>	<i>Session B</i>	<i>Session C</i>
16:50-17:10	<b>Zhang</b>	<b>Raichik</b>	<b>Rebenda</b>
17:15-17:35	<b>Polner</b>	<b>Pátíková</b>	<b>Svoboda</b>
17:40-18:00	<b>Bosschaert</b>	<b>Baštinec</b>	<b>Aldibekov</b>
18:05-18:25	<b>L. Horváth</b>	<b>Fujimoto</b>	<b>Orbán-Mihálykó</b>
18:45-20:45	<i>Welcome Party</i>		

*Time tables*

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**Tuesday, July 3**

8:30-9:20	<b>Stépan</b>
9:25-9:55	<b>Greenhalgh</b>
10:00-10:30	<i>Coffee Break</i>
10:30-11:00	<b>Faragó</b>
11:05-11:35	<b>Federson</b>
11:40-12:10	<b>Inesperger</b>
12:15-12:45	<b>Diblík</b>
12:50-14:30	<i>Lunch Break</i>
14:30-22:00	<i>Excursion and Conference Dinner</i>

**Wednesday, July 4**

8:30-9:20	<b>Walther</b>		
9:25-9:55	<b>Došlá</b>		
10:00-10:30	<i>Coffee Break</i>		
10:30-11:00	<b>Vas</b>		
11:05-11:35	<b>J. Migda</b>		
11:40-12:10	<b>L. Simon</b>		
12:15-14:00	<i>Lunch Break</i>		
14:00-14:30	<b>Slavík</b>		
14:35-15:05	<b>Schmeidel</b>		
15:10-15:40	<b>Şerban</b>		
15:45-16:15	<i>Coffee Break</i>		
16:15-16:45	<b>M. Migda</b>		
16:50-17:20	<b>Petropoulou</b>		
	<i>Session A</i>	<i>Session B</i>	<i>Session C</i>
17:25-17:45	<b>Bartha</b>	<b>Zemánek</b>	<b>Volinsky</b>
17:50-18:10	<b>Halim</b>	<b>Császár</b>	<b>Mizgireva</b>
18:15-18:35	<b>Dudás</b>	<b>Morales Macias</b>	<b>Pinhasov</b>
18:40-19:00			<b>Bershadsky</b>

*Time tables*

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**Thursday, July 5**

8:30-9:20	<b>Pötzsche</b>
9:25-9:55	<b>Kennedy</b>
10:00-10:30	<i>Coffee Break</i>
10:30-11:00	<b>Medved'</b>
11:05-11:35	<b>Domoshnitsky</b>
11:40-12:10	<b>Čermák</b>
12:15-14:00	<i>Lunch Break</i>
14:00-14:30	<b>Hangos</b>
14:35-15:05	<b>Z. Horváth</b>
15:10-15:40	<b>Garab</b>
15:45-16:15	<b>Szederkényi</b>
16:15-16:20	<i>Closing</i>
16:20-16:50	<i>Coffee Break</i>

## **Program**

### **Monday, July 2**

9:00-9:15     **Opening Session**

**Chair: G. Stépán**

9:20-10:10   **Tibor Krisztin:** Stable periodic orbits for the Mackey-Glass equation

**Chair: J. Graef**

10:45-11:15   **Kenneth Palmer:** Exponential separation in linear differential systems

11:20-11:50   **Tomás Caraballo:** Stochastic 2D Navier-Stokes equations with infinite delay

11:55-12:25   **Péter Simon:** The effect of graph properties on the threshold in network models

**Chair: K. Palmer**

14:00-14:30   **Teresa Faria:** Asymptotic behaviour for some classes of non-monotone delay differential equations

14:35-15:05   **John Graef:** Oscillation results for even-order nonlinear differential equations with a sublinear neutral term

15:10-15:40   **Gabriella Bognár:** On nonlinear surface growth models

**Chair: T. Faria**

16:15-16:45   **Gergely Röst:** Dynamics of new delay logistic equations arising from cell biology

**Session A**

**Chair: T. Faria**

- 16:50-17:10 **Li Zhang:** Nonlinear analysis of a scalar implicit neutral delay differential equation
- 17:15-17:35 **Mónika Polner:** The role of the time delay in the reflection and transmission of ultrashort electromagnetic pulses on a system of parallel current sheets
- 17:40-18:00 **Maikel Bosschaert:** Initialization of homoclinic solutions near Bogdanov-Takens points in delay differential equations
- 18:05-18:25 **László Horváth:** Sharp estimation for the solutions of inhomogeneous delay differential and Halanay-type inequalities

**Session B**

**Chair: A. Slavík**

- 16:50-17:10 **Vladimir Raichik:** The Sturm separation theorem for impulsive delay differential equations
- 17:15-17:35 **Zuzana Pátíková:** Hille-Nehari type criteria for conditionally oscillatory half-linear differential equations
- 17:40-18:00 **Jaromír Bařtinec:** Exponential stability of linear discrete systems with multiple delays
- 18:05-18:25 **Kōdai Fujimoto:** Oscillation constants for Euler type differential equations with  $p(t)$ -Laplacian

**Session C**

**Chair: J. Migda**

- 16:50-17:10 **Josef Rebenda:** Numerical solution of fractional control problems via fractional differential transformation
- 17:15-17:35 **Zdeněk Svoboda:** Linear differential equations of neutral type and retract method
- 17:40-18:00 **Tamasha Aldibekov:** On a first-order partial differential equation
- 18:05-18:25 **Éva Orbán-Mihálykó:** Application of delay and advanced difference equations in insurance mathematics

**Tuesday, July 3**

**Chair: H.-O. Walther**

- 8:30-9:20 **Gábor Stépán**: Parameter sensitivity in delay systems  
9:25-9:55 **David Greenhalgh**: Limiting behaviour of an SIS epidemic model with environmental stochasticity

**Chair: D. Greenhalgh**

- 10:30-11:00 **István Faragó**: Reliable numerical models in epidemic propagation  
11:05-11:35 **Marcia Federson**: New paths of path integrals  
11:40-12:10 **Tamás Insperger**: Models for human balancing with reaction delays  
12:15-12:45 **Josef Diblík**: Large-time behaviour of solutions of delayed-type linear differential equations

**Wednesday, July 4**

**Chair: C. Pötzsche**

- 8:30-9:20 **Hans-Otto Walther:** Differentiability in Fréchet spaces and delay differential equations  
9:25-9:55 **Zuzana Došlá:** Asymptotic problems for second order functional differential equations

**Chair: Z. Došlá**

- 10:30-11:00 **Gabriella Vas:** Saddle-node bifurcation of periodic orbits for a delay differential equation  
11:05-11:35 **Janusz Migda:** Asymptotic properties of solutions to difference equations of Volterra type  
11:40-12:10 **László Simon:** Multiple solutions of nonlinear elliptic equations and systems with nonlocal terms

**Chair: E. Petropoulou**

- 14:00-14:30 **Antonín Slavík:** Invariant regions for systems of lattice reaction-diffusion equations  
14:35-15:05 **Ewa Schmeidel:** Leader-following problem on times scales  
15:10-15:40 **Călin C. Șerban:** Some multiplicity results for boundary value problems with singular  $\phi$ -Laplacian

**Chair: I. Faragó**

- 16:15-16:45 **Malgorzata Migda:** Properties of solutions to second-order neutral difference equations  
16:50-17:20 **Eugenia Petropoulou:** A nonstandard "discretization" technique for the solution of ODEs

**Session A**

**Chair: J. Čermák**

- 17:25-17:45 **Ferenc A. Bartha:** Global stability in a system using echo for position control
- 17:50-18:10 **Yacine Halim:** On the solutions of a second-order difference equations in terms of generalized Padovan sequences
- 18:15-18:35 **János Dudás:** Global stability in difference equations

**Session B**

**Chair: G. Vas**

- 17:25-17:45 **Petr Zemánek:** Spectral theory of discrete symplectic systems
- 17:50-18:10 **Szilvia Császár:** Stability and bifurcation for a class of retarded dynamical systems
- 18:15-18:35 **Maria Guadalupe Morales Macias:** Fractional derivatives in the sense of the distributional Henstock-Kurzweil integral

**Session C**

**Chair: E. Schmeidel**

- 17:25-17:45 **Irina Volinsky:** Stabilization by delay distributed feedback control
- 17:50-18:10 **Iuliia Mizgireva:** Sign-constancy of Green's functions for two-point boundary value problems with second order impulsive differential equations
- 18:15-18:35 **Olga Pinhasov:** Distributed feedback control in model of testosterone regulation
- 18:40-19:00 **Marina Bershadsky:** Distributed control in stabilization of a model of infection diseases

**Thursday, July 5**

**Chair: T. Krisztin**

- 8:30-9:20 **Christian Pötzsche**: Nonautonomous bifurcations  
9:25-9:55 **Benjamin Kennedy**: Finding periodic solutions  
without finding eigenvalues

**Chair: B. Kennedy**

- 10:30-11:00 **Milan Medved'**: On exponential stability of  
fractionally perturbed ODEs  
11:05-11:35 **Alexander Domoshnitsky**: Positivity for non-Metzler  
systems  
11:40-12:10 **Jan Čermák**: Qualitative properties of linear  
autonomous delay differential systems: Integer versus  
non-integer order case

**Chair: M. Polner**

- 14:00-14:30 **Katalin Hangos**: Approximation of delayed chemical  
reaction networks  
14:35-15:05 **Zoltán Horváth**: Positively invariant sets for  
numerical methods for PDEs when semidiscretization  
does not preserve positive invariance  
15:10-15:40 **Ábel Garab**: Delay difference equations: permanence  
and the structure of the global attractor  
15:45-16:15 **Gábor Szederkényi**: Approximating the domain of  
attraction of uncertain nonlinear systems using linear  
matrix inequalities and Finsler's lemma