



International Online Conference on Applied Mathematics (IOCAM 22)

01-03, June 2022

Program

IOCAM 22 is jointly organized by the laboratory LAMA and Faculty of Sciences Dhar El

Mahraz, Sidi Mohamed Ben Abdellah University (Morocco)

Conference Chair

Prof. Nazih Abderrazzak Gadhi

Organizing committee

- *Prof. Ahmed aberqi (ENSA, Sidi Mohamed Ben Abdellah University)*
- *Prof. Adnane Azzouzi (FSDM, Sidi Mohamed Ben Abdellah University)*
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- *Prof. Stephan Dempe (Technische Universität Bergakademie Freiberg)*
- *Prof. Mhamed Eddahbi (King Saud University)*
- *Prof. Oussama El barrimi (FSDM, Sidi Mohamed Ben Abdellah University)*
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- *Prof. Nazih Abderrazzak Gadhi (FSDM, Sidi Mohamed Ben Abdellah University)*
- *Prof. Peter Hästö (University of Turku)*
- *Prof. Alireza Kabgani Urmia University of Technology, Iran*
- *Prof. El mostafa Kalmoun (Al Akhawayn University)*
- *Prof. Adil Khazari (ENCG, Sidi Mohamed Ben Abdellah University)*
- *Prof. Mounir Mekkour (FSDM, Sidi Mohamed Ben Abdellah University)*
- *Prof. Abdelmoutalib Metrane (Sultane Moulay Slimane University)*
- *Prof. Mostafa Ouarit (Hassan 2 University)*
- *Prof. Youssef Ouknine (Cadi Ayyad University)*
- *Prof. Mohammed Seaid (Durham University)*
- *Prof. Vladimir Shikhman (TU Chemnitz)*
- *Prof. Luz de Teresa (Universidad Nacional Autonoma de México)*
- *Prof. Abdelfettah Touzani (FSDM, Sidi Mohamed Ben Abdellah University)*
- *Prof. Souad Wardi (FSDM, Sidi Mohamed Ben Abdellah University)*
- *Prof. Alain Zemkoho (University of Southampton)*

Invited Keynotes

- *Prof. Stephan Dempe, Technische Universität Bergakademie Freiberg, Germany*



- *Prof. Mhamed Eddahbi, King Saud University, Kingdom of Saudi Arabia*



- *Prof. Peter Hästö, University of Turku, Finland*



- *Prof. Alireza Kabgani, Urmia University of technology, Iran*



- *Prof. Youssef Ouknine, Cadi Ayyad University, Morocco*



- *Prof. Mohammed Seaid, Durham University, United Kingdom*



- *Prof. Vladimir Shikhman, TU Chemnitz, Germany*



- *Prof. Luz de Teresa, Universidad Nacional Autonoma de México, Mexico*



- *Prof. Alain Zemkoho, University of Southampton, United Kingdom*



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June 01 **7-8**

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Detailed program: Wednesday, June 01st **12-14**

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**** Please note: the program is given in local Moroccan time**

[Current Local Time in Rabat, Morocco \(timeanddate.com\)](http://timeanddate.com)

Program at a glance

Wednesday, June 01st

The morning program

| | |
|-------|---|
| 09h30 | <p><u>Opening</u></p> <ul style="list-style-type: none">• Prof. Mohammed Benlemlih Dean of the faculty of Sciences Dhar El Mahraz• Prof. Jaouad Bennouna Head of the laboratory LAMA• Prof. Nazih Abderrazzak Gadhi Chairman of the conference |
| 10h00 | <p><u>Invited keynote</u></p> <p>Bilevel optimization using KKT transformation</p> <p>Prof. Stephan Dempe Technische Universität Bergakademie Freiberg, Germany (chair prof. N. Gadhi)</p> |
| 10h40 | <p><u>Break</u></p> |
| 10h50 | <p><u>Invited keynote</u></p> <p>Cardinality-constrained optimization problems in general position and beyond</p> <p>Prof. Vladimir Shikhman Chemnitz University of Technology, Chemnitz, Germany (chair prof. N. Gadhi)</p> |
| 11h30 | <p><u>Break</u></p> |
| 11h40 | <p><u>Invited keynote</u></p> <p>Solving PDEs in deformable domains: Remeshing the domain or reformulating the equations?</p> <p>Prof. Mohammed Seaid University of Durham, United Kingdom (chair prof. N. Gadhi)</p> |
| 12h20 | <p><u>End of session</u></p> |

Wednesday, June 01st

The afternoon program

| | |
|-------|---|
| 16h00 | <u>Invited keynote</u> Some results on the controllability of coupled parabolic equations Prof. Luz de Teresa Universidad Nacional Autonoma de México, Mexico (chair prof. N. Gadhi) |
| 16h40 | <u>Break</u> |
| 16h50 | <u>Invited keynote</u> Double phase and generalized Orlicz models for image restoration Prof. Peter Hästö University of Turku, Finland (chair prof. N. Gadhi) |
| 17h30 | <u>Break</u> |
| 17h40 | <u>Session 1</u> (chair prof. M. Seaid) |
| 18h30 | <u>Break</u> |
| 18h40 | <u>Session 2</u> (chair prof. P. Hästö) |
| 19h30 | <u>End of sessions</u> |

Thursday, June 02nd

The morning program

| | |
|-------|---|
| 09h30 | <p><u>Invited keynote</u></p> <p>Noyaux de transition et construction des processus de Markov</p> <p>Prof. Youssef Ouknine Cadi Ayyad university, Morocco</p> <p>(chair prof. N. Gadhi)</p> |
| 10h10 | <p><u>Break</u></p> |
| 10h20 | <p><u>Invited keynote</u></p> <p>Recent developents on backward SDEs with jumps and related PIDEs</p> <p>Prof. M. Eddahbi King Saud university, Kingdom of Saudi Arabia</p> <p>(chair prof. Y. Ouknine)</p> |
| 11h00 | <p><u>Break</u></p> |
| 11h10 | <p><u>Session 3</u></p> <p>(chair prof. M. Eddahbi)</p> |
| 12h20 | <p><u>Break</u></p> |
| 12h30 | <p><u>Session 4</u></p> <p>(chair prof. O. El barrimi)</p> |
| 13h40 | <p><u>End of sessions</u></p> |

Thursday, June 02nd

The afternoon program

| | |
|-------|--|
| 16h00 | <u>Invited keynote</u> Newton-type methods for bilevel optimization Prof. A. Zemkoho University of Southampton, United Kingdom (chair prof. S. Dempe) |
| 16h40 | <u>Break</u> |
| 16h50 | <u>Invited keynote</u> New Subdifferentials in Nonsmooth Optimization Prof. A. Kabgani Urmia university of Technology, Iran (chair prof. A. Zemkoho) |
| 17h30 | <u>Break</u> |
| 17h40 | <u>Session 5</u> (chair prof. A. Kabgani) |
| 18h30 | <u>Break</u> |
| 18h40 | <u>Session 6</u> (chair prof. V. Shikhman) |
| 19h30 | <u>End of sessions</u> |

Friday, June 03th

Sessions' breakdown by topic

➤ Optimization

| | |
|-------|--|
| 09h30 | <u>Session 7</u> (chair prof. E. Kalmoun) |
| 11h10 | <u>Break</u> |
| 11h20 | <u>Session 8</u> (chair prof. E. Kalmoun) |
| 12h00 | <u>End of sessions</u> |

➤ Optimal control

| | |
|-------|--|
| 09h30 | <u>Session 9</u> (chair prof. M. Ouarit) |
| 11h10 | <u>Break</u> |
| 11h20 | <u>Session 10</u> (chair prof. M. Ouarit) |
| 12h30 | <u>End of sessions</u> |

➤ Numerical analysis

| | |
|-------|---|
| 09h30 | <u>Session 11</u> (chair prof. S. Wardi) |
| 11h10 | <u>Break</u> |
| 11h20 | <u>Session 12</u> (chair prof. S. Wardi) |
| 12h00 | <u>End of sessions</u> |

➤ Partial differential equations

| | | |
|-------|--|---|
| 09h30 | <u>Session 13</u> (Chair Prof. A. Aberqi) | <u>Session 15</u> (Chair Prof. Akdim) |
| 11h10 | <u>Break</u> | |
| 11h20 | <u>Session 14</u> (Chair Prof. A. Aberqi) | <u>Session 16</u> (chair prof. A. Akdim) |
| 12h30 | <u>End of sessions</u> | |

➤ Mathematical modeling

| | | |
|-------------------------------------|--|---|
| 09h30 | <u>Session 17</u> (Chair Prof. O. El barrimi) | <u>Session 19</u> (Chair Prof. A. Barbara) |
| 11h10 | <u>Break</u> | |
| 11h20 | <u>Session 18</u> (Chair Prof. O. El barrimi) | <u>Session 20</u> (chair prof. A. Barbara) |
| 12h00 | <u>End of sessions</u> | |
| <u>End of the conference</u> | | |

Detailed program: Wednesday, June 01st

✚ 09h30 – 10h00 Opening Session

- ✓ **Prof. Mohammed Benlemlih**
Dean of the faculty of sciences Dhar El Mahraz
- ✓ **Prof. Jaouad Bennouna**
Head of laboratory LAMA
- ✓ **Prof. Nazih Abderrazzak Gadhi**
Chairman of the conference

✚ 10h00 – 10h40

Invited keynote (chair : prof. N. Gadhi)

Bilevel optimization using KKT transformation

Prof. Stephan Dempe
Technische Universität Bergakademie Freiberg, Germany

✚ 10h40 – 10h50 Break

✚ 10h50 – 11h30

Invited keynote (chair : prof. N. Gadhi)

Cardinality-constrained optimization problems in general position and beyond

Prof. Vladimir Shikhman
Chemnitz University of Technology, Chemnitz, Germany

✚ 11h30 – 11h40 Break

✚ 11h40 – 12h30

Invited keynote (chair : prof. N. Gadhi)

Solving PDEs in deformable domains: Remeshing the domain or reformulating the equations?

Prof. Mohammed Seaid
University of Durham, United Kingdom

✚ 12h30 – 16h00 Lunch Break

✚ 16h00 – 16h40

Invited keynote (chair : prof. N. Gadhi)

Some results on the controllability of coupled parabolic equations

Prof. Luz de Teresa
Universidad Nacional Autonoma de México, Mexico

✚ 16h40 – 16h50 Break

✚ 16h50 – 17h30

Invited keynote (chair : prof. N. Gadhi)

Double phase and generalized Orlicz models for image restoration

Prof. Peter Hästö
University of Turku, Finland

✚ 17h30 – 17h40 Break

✚ 17h40 – 18h30

Session 1 (chair prof. M. Seaid)

- *Controllability of the degenerate/singular Schrödinger equation*
[J. Salhi](#)
- *Stability analysis using Pseudospectra of RBF-PUM application: Unsaturated flow problem*
[M. Ljerch](#), [M. Sadik](#) and [A. Beljadi](#)
- *Existence and Uniqueness for some non-resonant quasilinear elliptic systems with variable exponents*
[A. Ouannasser](#) and [A. El Hachimi](#)

✚ 18h30 – 18h40 Break

✚ 18h40 – 19h30

Session 2 (chair prof. P. Hästö)

- *A double phase problem with singularity*
[O. Benslimane](#), [A. Aberqi](#), [J. Bennouna](#) and [M. A. Ragusa](#)
- *Double phase problem with obstacle and Hardy potential*
[A. Aberqi](#) and [A. Taghi](#)
- *Existence of weak periodic solutions for a coupled nonlinear parabolic-elliptic system*
[M. Elmassoudi](#), [Y. Ahakkoud](#) and [J. Bennouna](#)

Detailed program: Thursday, June 02nd

✚ 09h30 – 10h10

Invited keynote (chair : prof. N. Gadhi)

Noyaux de transition et construction des processus de Markov

Prof. Youssef Ouknine
Cadi Ayyad University, Morocco

✚ 10h10 – 10h20 Break

✚ 10h20 – 11h00

Invited keynote (chair : prof. Y. Ouknine)

Recent developments on backward SDEs with jumps and related PIDEs

Prof. Mhamed Eddahbi
King Saud University, Kingdom of Saudi Arabia

✚ 11h00 – 11h10 Break

✚ 11h10 – 12h20

Session 3 (chair prof. M. Eddahbi)

- *Backward stochastic dynamics driven by an unbounded subdifferential operator on a filtered probability space*
[E. Rotenstein](#)
- *On the Stability of mean-field stochastic differential equations with irregular expectation functional*
[O. El barrimi](#)
- *Berry-Esséen bounds of second moment estimators for Gaussian processes observed at high frequency*
[S. Douissi, K. Es-Sebaï, G. Kerchev and I. Nourdin](#)
- *Generalized partially linear single index model for functional projection pursuit regression*
[M. Alahiane, I. Ouassou, M. Rachdi and P. Vieu](#)

✚ 12h20 – 12h30 Break

✚ 12h30 – 13h40

Session 4 (chair : prof. O. El barrimi)

- *Markov chain anticipatory heuristic by simulated annealing algorithm for traveling Salesman problem*
[M. Abdolhosseinzadeh and M. M. Alipour](#)
- *On the change point test in the AR(1) model*
[M. S. Arrouch and E. EL harfaoui](#)
- *Hill-type estimator of the shape parameter for a heavy-tailed distribution under random censoring: Application to the conditional tail expectation*
[N.E. Guesmia, D. Meraghni and L. Soltane](#)
- *A new classe of the modified lindley distribution : propertes and application*
[A.Ghouar and Z. Djeridi](#)

✚ 12h30 – 12h40 Lunch Break

✚ 16h00 – 16h40

Invited keynote (chair : prof. S. Dempe)

Newton-type methods for bilevel optimization

Prof. Alain Zemkoho
University of Southampton, United Kingdom

✚ 16h40 – 16h50 Break

✚ 16h50 – 17h30

Invited keynote (chair : prof. A. Zemkoho)

New Subdifferentials in Nonsmooth Optimization

Prof. Alireza Kabgani
Urmia university of Technology, Iran

✚ 17h30 – 17h40 Break

✚ 17h40 – 18h30

Session 5 (chair prof. A. Kabgani)

- *Maximum flowloc with intermediate storage: a temporally repeated approach*
U. Pyakurel, S. Wagle, D. Prasad Khanal, T. N. Dhamala and S. Dempe
- *Asymptotic convergence of inertial gradient dynamics with Tikhonov regularization*
A. Balhaq
- *Maximum FlowLoc with Excess Storage*
S. Wagle, U. Pyakurel and T. Nath Dhamala

✚ 18h30 – 18h40 Break

✚ 18h40 – 19h30

Session 6 (chair prof. V. Shikhman)

- *Filter algorithm for solving nonsmooth nonconvex constrained optimization problems*
N. H. Monjezi
- *Route based evacuation in asymmetric contraflow network with flow circulation at destination*
D. P. Khanal, U. Pyakurel, T. N. Dhamala and S. Dempe
- *Necessary optimality conditions of robust nonsmooth multiobjective optimization problems*
N. Gadhi and M. Ohda

Detailed program: Friday, June 03th

Sessions' breakdown by topic

Optimization

✚ 09h30 – 10h40

chair : prof. E. Kalmoun

Session 7

- *Decision Support System for Hybrid Flow Shop Scheduling Problem*
[A.Zammiti](#), [A. Ben ali](#), [H.K Hachicha](#) and [S. Bouajaja](#)
- *Decision Support System for Scheduling surgerie within a private healthcare facility*
[H.K Hachicha](#), [S. Bouajaja](#), [A. Abdelkrim](#) and [S. Fhal](#)
- *A decision support system for evaluating the Supply chain logistics risks in the automotive industry: Moroccan case*
[N. Kayouh](#)
- *The Heavy ball method regularized by Tikhonov term. Simultaneous convergence of values and trajectories*
[A. C. Bagy](#), [Z. Chbani](#) and [H. Riahi](#)

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h00

chair : prof. E. Kalmoun

Session 8

- *Necessary optimality conditions for a multiobjective semi-infinite interval-valued programming problem*
[N.A. Gadhi](#) and [M. El idrissi](#)
- *Optimality conditions for a nonsmooth semi-infinite vector fractional interval-valued optimization problem*
[N. Gadhi](#) and [A. Ichatouhane](#)
- *A new method for solving nonlinear programs based on successives majorization methods*
[A. Fadil](#) and [A. Roubi](#)
- *Sufficient KKT optimality conditions and Mond Weir duality results for a fractional non convex optimization problem*
[N. Gadhi](#) and [F.Z. Rahou](#)

Optimal control

✚ 09h30 – 10h40

chair : prof. M. Ouarit

Session 9

- **Controllability of degenerate parabolic system with memory**
B. Allal, G. Fragnelli and J. Salhi
- **Exponential stabilization of non-homogeneous semi-linear systems by bounded feedback control**
M. Chqondi, M. Baddi and Y. Akdim
- **Bilinear stabilization of first order evolution equations by a class of bilinear unbounded feedbacks**
K. Ammari, S. El alaoui and M. Ouzahra
- **Exponential decay rate estimate for a class of delayed bilinear systems**
A. Delbough, Y. Benslimane and H. El Amri

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h30

chair : prof. M. Ouarit

Session 10

- **Partial weak stabilization of some class of unbounded bilinear system**
R. El ayadi
- **Strong and weak stabilization of non-homogeneous semi-linear systems by bounded feedback control**
M. Baddi, M. Chqondi and Y. Akdim
- **Weak and strong stabilization of semilinear systems in nonreflexive Banach spaces**
Z. Ech-chaffani, A. Aberqi and A. El Alami
- **Strong stabilization and decay estimate for a class of unbounded bilinear time-delay systems of neutral type**
M. Fakhri, A. El houche and A. Attioui
- **Some Remarks on control of variable order fractional systems with type one Riemann-Liouville derivative**
A. Khazari and T. Karite
- **Optimal control problem for fractional systems with control delay**
T. Karite and A. Khazari

Numerical analysis

✚ 09h30 – 10h40

chair : prof. S. Wardi

Session 11

- *Fitting data by algebraic hyperbolic cubic Hermite Spline interpolation*
M. Oraiche, A. Lamnii and M. Louzar
- *Mechanical Analysis of functionally graded plates using finite element method*
K. Zaharij, O. Bourihane and R. El khaoulani El idrissi
- *Shifted Legendre Galerkin method to solve Fredholm integro-differential equations*
Z. Laouar and N. Arar
- *On the inverse of a Toeplitz Pentadiagonal matrix based on the CL factorization of a Tridiagonal matrix*
B. Talibi, A. Driss, A. Hadj and D. Sarsri

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h00

chair : prof. S. Wardi

Session 12

- *An inverse backward problem for a heat equation with a memory term*
S. Abid, K. Atifi and E.H. Essoufi
- *A hybrid finite volume scheme for reactive solute transport in porous media naturally suited for a domain decomposition approach*
M. Zarrouk
- *Numerical Analysis of Nonlinear Heat Conduction in 2D Thin Plate*
M. Taibi, Y. Abouelhanoune and F. Dimane
- *A robust fuzzy clustering algorithm based on possibilistic approach and invariant orthogonal moment in noisy nonlinear space*
S. Azzouzi, J. El mekkaoui, A. Hjouji and A. EL khalfi

Partial differential equations (1)

✚ 09h30 – 11h40

chair : prof. Y. Akdim

Session 13

- Existence of entropy solutions for some quasilinear $\overline{p(x)}$ elliptic problems of infinite order involving singularities and L^1 -data
[M. Bouziani](#), [E. Azroul](#) and [M. Chrif](#)
- Quasilinear parabolic systems in divergence form with variable growth and weak monotonicity and refined conditions
[E. Azroul](#) and [A. Daïfe](#)
- Capacity in fractional Orlicz-Sobolev spaces
[M.C. Hassib](#) and [Y. Akdim](#)
- Some global bifurcation results for a class of semilinear elliptic problems
[S. Hakimi](#) and [H. Chahi](#)

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h30

chair : prof. Y. Akdim

Session 14

- Existence of solution and uniqueness for modified Signorini problem with nonlocal friction in electro-elasticity
[E.H. Benkhira](#), [I. El ouardy](#), [R. Fakhar](#) and [A. Hachlaf](#)
- On a classe of fourth order critical $p(x)$ -Kirchhof type problem with no-flux boundary condition
[K. Soualhine](#), [M. Talbi](#), [M. Filali](#) and [N. Tsouli](#)
- Existence of entropy solutions for some noncoercive unilateral elliptic problems in anisotropic sobolev spaces
[M. Belayachi](#), [Y. Hajji](#) and [H. Hjiat](#)
- Liouville type theorems for stable solutions of elliptic system involving the Grushin operator
[F. Mtiri](#)
- Existence and uniqueness results of an anisotropic obstacle Problem
[A. Salmani](#)
- Solvability of strongly nonlinear elliptic problems in Musielak-Orlicz spaces
[O. Azraïbi](#), [B. El haji](#) and [M. Mekour](#)

Partial differential equations (2)

✚ 09h30 – 10h40

chair : prof. A. Aberqi

Session 15

- **Existence of a renormalized solution for a class of nonlinear degenerated parabolic problem with unbounded heat conduction and integrable data**
Y. Akdim, M. El fatry and M. Mekour
- **Existence of solutions for some nonlinear and non-coercive elliptic problem with hardy potentiel and L1-data**
R. Zerouali, B. Ferrahi and H. Hjjaj
- **On asymptotically almost automorphic solutions of linear neutral difference differential equations**
C. Bouzar and F.Z. Tchouar
- **Nonlinear elliptic equations with Hardy potential, lower order term and with L1 Data**
F. Achhoud and A. Bouajaja

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h30

chair : prof. A. Aberqi

Session 16

- **Nonlinear evolution equations with diffuse measure data**
B. El hamdaoui, K. Moutaouakil and J. Bennouna
- **Renormalized solution for $p(x)$ -parabolic equations with singular measure data**
K. Moutaouakil, J. Bennouna, B. El hamdaoui and H. Redwane
- **Weighted essential self-adjointness of simplicial complexes Laplacians**
A. Baalal and K. Hatim
- **Some characterizations of the ideals E^{α} which are discrete**
H. Khabaoui, K. El fahri, S. Laachachi and J. H'michane
- **The $(n; m; p(x); w)$ weak solution of some elliptical systems in four cases of monotony**
E. Rami, E. Azroul and A. Barbara

Mathematical modeling (1)

✚ 09h30 – 10h40

chair : prof. O. El barrimi

Session 17

- *Stapanov-dynamic behavior of recurrent neural networks with time-varying delays*
M. Es-saiydy and M. Zitane
- *A discrete mathematical modeling and optimal control of diseases caused by fusarium oxysporum*
Y. Baala and M. Rachik
- *Stability result of general variable-order discrete fractional neural network*
A. Hioual, A. Ouannas and T.E. Oussaeif
- *Forecasting the active cases of Covid-19 in Morocco by a new stochastic Rayleigh diffusion process*
Y. Chakroune and A. Nafidi

✚ 10h40 – 10h50 Break

✚ 10h50 – 12h00

chair : prof. O. El barrimi

Session 18

- *Mathematical Analysis and Bifurcation of an Epidemic Model with Delays*
F. Najm, R. Yafia, M.A. Aziz Alaoui, and A. Aghriche
- *Mathematical modeling of the dynamics of Covid-19 in multi-regions: optimal control approach*
D. Kada, B. Khajji, O. Balatif and M. Rachik
- *Radial basis functions methods for infiltration from a strip source*
M. Sadik, F.Z. Sadik, A. Beljadid and E.H. Ben-Ahmed
- *Mathematical analysis of the coronavirus (COVID-19) spread through a compartmental epidemic model*
D. Kiouach, S. El Azami El-idrissi and Y. Sabbar

Mathematical modeling (2)

+ 09h30 – 10h40

chair : prof. A. Barbara

Session 19

- *Etude d'un modèle d'évolution de transmission de la maladie de Chagas*
N. Dib-Baghdadli, R. Labbas, T. Mahdjoub and A. Medeghri
- *Mathematical analysis of a competition model between two types of cells in a tissue*
F. Borsali
- *Sensitivity analysis and optimal control of Tuberculosis in Morocco based on the SEIR model*
L. Benahmadi, M. Lhous and A. Tridane
- *Nonlocal Robin Boundary Conditions On arbitrary Domains*
N. Ait Oussaid, K. Akhlil, S. Ben Aadi and M. El Ouali

+ 10h40 – 10h50 Break

+ 10h50 – 12h20

chair : prof. A. Barbara

Session 20

- *Analysis and simulation of the immuneresponse of HBV infection by the fractional model with therapy*
F.E. Fikri and K. Allali
- *Spatio-temporal SIR model with Robin boundary condition and lockdown*
O. Elamraoui, E. H. Essoufi and A. Zafrar
- *A decision support system for evaluating the Supply chain logistics risks in the automotive industry : Moroccan case*
N. Kayouh
- *Mathematical modelling of political party switchers: optimal control approach*
A. Sakkoum, S. Ben rhila, M. Lhous, M. Rachik and A. Tridane
- *A Mixture of Exponential-Lindley Distribution with Application in Failure Data*
T. Belhamra and H. Zeghdoudi

End of the conference