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Research Laboratory *:Laboratoire Analyse Non linéaire et Mathématiques Appliquées.*

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Date of birth : *11/03/1976*

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Professional address : *BP N° 119, Faculté des Sciences, Département de Mathématiques, Université Abou Bekr Belkaid,* ***Tlemcen, ALGERIE.***

Position : *Full Professor and Founding Member of the Algerian Academy of Sciences and Technologies, 2015.*

Research Interests : *Populations dynamics , epidemiological modeling, hematopoietic stem cell models*

Publications

1. **N. Ghouali, T.M. Touaoula,** A linear model for the dynamics of fish larvae, **Elec. J. Diff. Eq.** 140, 1-10, **2004**.
   www.ejde.math.txstate.edu

2. **N. Ghouali, T.M. Touaoula,** Non autonomous ultraparabolic equations applied to population dynamics, **Elec. J. Diff. Eq**. 119, 1-11, **2005**.
   www.ejde.math.txstate.edu

3. **T. M. Touaoula, N. Ghouali,** Gradient estimates for solutions of ultraparabolic equations, **Mediterranean journal of Mathematics,** vol 5, 101-111, **2008**.
   http://www.springerlink.com
   www.dm.uniba.it

4. **B. Perthame, T. M. Touaoula,** Analysis of a cell system with finite divisions, **Bol. Soc. Esp. Mat. Apl**. **(SEMA)**, N 44, 53-77, **2008**.
   www.sema.org.es

5. **B. Abdellaoui, A. Primo, T. M. Touaoula,** Existence, Nonexistence and Multiplicity result for semilinear elliptic problems with measure data and

absorption reaction-diffusion term, Differential Equations and Applications, 1, N 2, *253—284,* **2009**.
http://dea.ele-math.com/

6. **B. Abdellaoui, T. M. Touaoula,** DECAY SOLUTION FOR THE RENEWAL EQUATION WITH DIFFUSION, **Nonlinear Differential Equations and Applications , (NoDea)**, 271-288, **2010**.
http://www.springerlink.com/content/101200/

7. **Philippe Michel, T.M. Touaoula,** Asymptotic behavior for a class of the renewal nonlinear equation with diffusion, **Mathematical Methods in the Applied Sciences (M2AS)** 36 (3), 323-335, **2013**.
https://onlinelibrary.wiley.com/doi/abs/10.1002/mma.2591

8. **B Abdellaoui, T. M. Touaoula ,** Global attractivity for nonlinear differential equations with a nonlocal term **Electronic Journal of Differential Equations** , 177 , 1-13, **2014**.
https://ejde.math.txstate.edu/Volumes/2014/177/abdellaoui.pdf

9. **B. Abdellaoui, S. EH. Miri, I. Peral, T. M. Touaoula,** Some remarks on quasilinear parabolic problems with singular potential and a reaction term, **Nonlinear Differential Equations and Applications , (NoDea)**, 21, 4, 453-490, **2014.**
https://link.springer.com/article/10.1007/s00030-009-0053-6

10. **M. Adimy, A. Chekroun, T. M. Touaoula,** A delay differential-difference system of hematopoietic stem cell dynamics, **Comptes Rendus Math** 353, 4, 303-307, **2015**.
https://www.sciencedirect.com/science/article/pii/S1631073X15000448

11. **M. Adimy, A. Chekroun, T. M. Touaoula ,** Age structured and delay differential-difference model of hematopoietic stem cell dynamics., **DCDS-B,** V 20, N 9, 2765-2791, **2015.**
http://www.aimsciences.org/journal/1531-3492/2015/20/9

12. **S. Bentout, T. M. Touaoula**, Global analysis of an infection age model with a class of nonlinear incidence rates. .**J. Math. Anal. Appl.** 434, 1211-1239, **2016**.
https://www.sciencedirect.com/science/article/pii/S0022247X15008951

13. **M. Adimy, A. Chekroun, T. M. Touaoula ,** Global asymptotic stability for an age-structured model of hematopoietic stem cell dynamics, **Applicable Analysis,** 1-12, **2017**.
https://www.tandfonline.com/doi/full/10.1080/00036811.2016.1139698

14. **C. Aboura, T. M. Touaoula, M. Aribi,** The pulse vaccination effects in mammary carcinoma, ***Int. J. Biomath.* 10**, N. 03, 1750036, **2017.**

   https://www.worldscientific.com/doi/10.1142/S179352451750036X

15. **B. Abdellaoui, A. Boucherif, T. M. Touaoula,** Nonlocal Initial Conditions for Fractional Diffusion Problems, ***AIP Confezrence Proceedings***, 1830, 020031, **2017,** doi : 10.1063/1.4980894, American Institute of Physics.
   https://aip.scitation.org/doi/10.1063/1.4980894

16. **B. Abdellaoui, A. Boucherif, T. M. Touaoula,** Fractional parabolic problems with a nonlocal initial condition, ***Moroccan J. of Pure and Appl. Anal.*** 3(1), 116-132, **2017.**
   https://content.sciendo.com/view/journals/mjpaa/3/1/article-p116.xml

17. **S. Djilali, T. M. Touaoula, S. E. Miri,** A Heroin Epidemic Model : Very General Nonlinear Incidence, Treat-Age, and Global Stability, ***Acta. Appl. Math***., 152, 171-194, **2017**.
   https://link.springer.com/article/10.1007/s10440-017-0117-2

18. **M. N. Frioui, S. E. Miri, T.M. Touaoula,** Unified Lyapunov functional for an age structured virus model with very general nonlinear infection response, ***J. Appl. Comput***., 58, 47-73, **2018**.
   https://link.springer.com/article/10.1007/s12190-017-1133-0

19. **T. M. Touaoula,** Global stability for a class of functional differential equations (Application to Nicholson's blowflies and Mackey-Glass models), ***Discrete and Continuous Dynamical Systems-A,*** 38, 9, 4391-4419, **2018**.
   http://www.aimsciences.org/article/doi/10.3934/dcds.2018191

20. **I. Boudjema, T.M. Touaoula,** Global stability of an infection and vaccination age-structured model with general nonlinear incidence, ***J. Nonlinear Functional Analysis,*** 1-21, doi.org/10.2395/jnfa2018.33, **2018**
   http://jnfa.mathres.org/archives/1701

21. **A. Chekroun, M.N. Frioui, T. Kuniya, T.M. Touaoula,** Global stability of an age structured model with general Lyapunov functional, ***Math. Biosc. and Engineering.***, 16(3), 1525-1553, **2019.**
   http://www.aimspress.com/MBE/2019/3/1525

22. **N. Bessonov, G. Bocharov, T.M. Touaoula, S. Trofimchuk, V. Volpert,** Delay reaction-diffusion equation for infection dynamics, ***Discrete and Continuous Dynamical Systems-B,*** 24(5), May **2019.**
   http://www.aimsciences.org/article/doi/10.3934/dcdsb.2019085

23. **N. Frioui, T.M. Touaoula, B. Ainseba,** Global dynamics of an age-structured model with relapse, ***Discrete and Continuous Dynamical Systems-B,*** 25, 9, 2020, **2245-2270** . **doi: 10.3934/dcdsb.2019226**

https://www.aimsciences.org/article/doi/10.3934/dcdsb.2019226

24. T.M. Touaoula, M. N. Frioui, N. Bessonov, V. Volpert,

DYNAMICS OF SOLUTIONS OF A REACTION-DIFFUSIONEQUATION WITH DELAYED INHIBITION, *DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS SERIES S,*
13, 9, 2020, 2425-2442.   doi:10.3934/dcdss.2020193,

https://www.aimsciences.org/article/doi/10.3934/dcdss.2020193

25. **T.M. Touaoula,** Global dynamics for a class of reaction-diffusion equations with distributed delay and Neumann condition**, Communication on Pure and Applied Analysis, 19, 5, 2020, 2473-2490. doi: 10.3934/cpaa.2020108**

https://www.aimsciences.org/article/doi/10.3934/cpaa.2020108

26. **A. Chekroun, M. N. Frioui, T. Kuniya, T. M. Touaoula,**

Mathematical analysis of an age structured heroin-cocaine epidemic model**,** *Discrete and Continuous Dynamical Systems-B,* **2020,**

doi: 10.3934/dcdsb.2020107
https://www.aimsciences.org/article/doi/10.3934/dcdsb.2020107

27. Toshikazu Kuniya, Tarik Mohammed Touaoula, Global dynamics for a class of functional differential equations with distributed delay and non-monotone bistable nonlinearity, *Math. Biosci. Eng.* 17 (2020) 7332-7352**.**
https://www.aimspress.com/article/id/5f98036bba35de6db5dfd8ed

28. Soufiane Bentout, Abdessamad Tridane, Salih Djilali, Tarik Mohammed Touaoula, Age-structured Modeling of COVID-19 Epidemic in the USA, UAE and Algeria. *Alexandria Engineering Journal, 60,* (2021)*,* 401-411.
https://doi.org/10.1016/j.aej.2020.08.053

29. **Soufiane Bentout,   Salih Djilali, S. Kuma, Tarik Mohammed Touaoula,** Threshold dynamics of difference equations for SEIR model with nonlinear incidence function and infinite delay, **Europ. Phys. J. Plus,** 136(5), 2021, 587
https://link.springer.com/article/10.1140/epjp/s13360-021-01466-0

30. Salih Djilali, Soufiane Bentout, Tarik Mohammed Touaoula, Abdessamad Tridane, Global dynamics of alcoholism epidemic model with distributed delays, *Math. Biosci. Eng.* 18(6),   (2021) 8245-8256.
https://www.aimspress.com/article/doi/10.3934/mbe.2021409

31. S.Djilali, S.Bentout, T.M. Touaoula, A.Tridan, S.Kumar, **Global behavior of Heroin epidemic model with time distributed delay and nonlinear incidence function,** Results in Physics, **31**, December 2021, 104953.

32. **Sari, Z., Touaoula, T. M.,** & Ainseba, B. Mathematical analysis of an age structured epidemic model with a quarantine class. *Mathematical Modelling of Natural Phenomena*, (2021), *16*-57.

33. **Salih Djilali, Soufiane Bentout, Sunil Kumar, Tarik Mohammed Touaoula,** Approximating the asymptomatic infectious cases of the COVID-19 disease in Algeria, and India using a mathematical model, **International Journal of Modeling, Simulation, and Scientific Computing,** 2022, https://doi.org/10.1142/S1793962322500283

34. **Bentout, S., Djilali, S**., **Touaoula, T. M**., **Zeb, A., Atangana, A**. Bifurcation analysis for a double age dependence epidemic model with two delays. Nonlinear Dynamics, (2022) 1-15.

35. **Hathout, F. Z**., **Touaoula, T. M., Djilali, S**. Mathematical analysis of a triple age dependent epidemiological model with including a protection strategy. Discrete Continuous Dynamical Systems-B. 27, 12, (2022), 7409-7443, doi:10.3934/dcdsb.2022048

36. **Kuniya T., Touaoula T.M,** Global dynamics for a class of reaction-diffusion equations with distributed delay and non-monotone bistable nonlinearity, Applicable Analysis https://www.tandfonline.com/doi/full/10.1080/00036811.2022.2102488

37. **Frioui M. N, Touaoula T.M,** Global dynamics of a delayed reaction-diffusion viral infection in a cellular environment. Advances in Epidemiological Modeling and Control of Viruses. (2023) 1-28. https://www.sciencedirect.com/science/article/abs/pii/B9780323995573000065

38. **Hathout, F. Z**., **Touaoula, T. M., Djilali, S**. Efficiency of Protection in the Presence of Immigration Process for an Age-Structured Epidemiological Model. Acta Applicandae Mathematicae. 185, 3, (2023) https://doi.org/10.1007/s10440-023-00572-8

39. **Djilali S**., **Bentout . S, Touaoula T.M, Atangana A,** Threshold dynamics for an age-structured heroin epidemic model with distributed delays. Mathematical Methods in Applied Science (M2AS), DOI: 10.1002/mma.9275.

40. **Touaoula M.T,** Long time behaviour for a mixed reaction-diffusion-difference problem with distributed delay and non-local term. Journal of Mathematical Analysis and Applications (JMAA), 526, 2, 127264. https://www.sciencedirect.com/science/article/abs/pii/S0022247X23002676

Communications

1. **2002** - Participation in the International Symposium on Partial Differential Equations, held at the USTHB on 27-28 and 29 October 2002 with a presentation entitled:

« Modèle de la Dynamique d'une Population Marine, Existence et Positivité de la solution. »

2. **2003** - Participation at CIMPA school: Non Linear Control and Applications, which took place in Tlemcen - ALGERIE.

3. **2003**- Participation in the First International Conference on Mathematical and Computer Models and Methods in Population Dynamics, which held in Tlemcen with a presentation entitled
   "Multilayer Model for the Dynamics of a Marine Population. "

4. **2004** - Participation in the First International Conference of the French-speaking Society of Theoretical Biology, which held in Marrakesh, Morocco with a presentation entitled
   "Multilayer Model of the Dynamics of a Marine Population."

5. **2007** - Participation in the first Euro-Mediterranean Conference on Biomathematics, which held in Cairo, Egypt 26-28 June 2007 with a presentation entitled:
   " Multilayer model and ultrapaprabolic equations"

6. **2014**- Participation at the international conference RAMA '9, which held in Laghouat, Algeria and presentation of a plenary conference entitled:
   "Modeling in epidemiology."

7. **2014**- Participation at the international conference LEM2I, which held at the CIRM, Marseille, France and presentation of a plenary conference entitled:
   Global stability for a non-linear epidemic model with variable infectivity.

8. **2017-** Participation at the international conference Trends in Mathematical Applications in Tunisia, Algeria and Morocco (TAM-TAM) and presentation of a plenary conference entitled:
   "Global stability of functional differential equations"

9. **2018-** Participation in the "Mathematics, Applications and Interaction with Physics" days organized at the Hassan II Academy, Rabat Morocco, 24-25 September, and presentation of a plenary conference entitled:
   "Global stability of difference-differential equation".

10. 2019- Participation in the Conference of the Euro-Maghreb International research Network in Mathematics and Applications, days organized at Madrid, Spain, 18-22 November and presentation of a plenary conference entitled: "Global Dynamics for a class of Non-monotone Delay differential equations"

Defended PHD Thesis under my supervision

Name : **Sofiane Bentout**

Title : Applied Mathematics to Some Epidemiological Models
 Year : 2016

Name : **Chahinez Aboura**

Title: Mathematical study of some problems describing a cell population dynamics
Year : 2017.

Name : **Ismail Boudjema**

Title: Global stability of an infection and vaccination age-structured model with general

nonlinear incidence
Year : 2020.

Name: **Mohammed Nor Frioui**,

Title : Unified Lyapunov functional for an age structured virus model with very general

nonlinear infection response,

Year : 2020

Name : **Hathout Fatima Zohra**

Title : Etude d'une classe de problèmes non-locaux.
             Applications à la dynamique de populations

Year : 2023

Name : **Sari Zakya**

Title : Sur un modèle épidémiologique structuré en âge.
        Stabilité et contrôle optimal.

Year : 2023

Referee for the following mathematical journals

1- Arabian Journal of Mathematics

2- Journal of Mathematical Analysis and Applications

3- Mathematical Methods in the Applied Sciences

4- Nonlinear Analysis : Real World Applications

5- Boundary Value problems

6- Journal of Dynamical and Control systems

Organization of scientific manifestations

1- Modeling Complex Systems : Dynamics of populations, epidemics and renewable resources, Tlemcen 03-05 December 2013. **Member of the organizing committee**

2- International Conference on Mathematics for the Natural and Life Sciences, ICMNLS, Tlemcen 9-11 November 2014. **Member of the organizing committee**

3- Organization of the Second Algerian-French workshop, which held at Tlemcen 30 April-03 May 2017. **Member of the organizating committee.**

4- Days 24-25 April 2018 «Local, Nonlocal problems and differential inclusions ", in honor of Professor Abdelkader Boucherif. **Member of the organizing committee**

5- Organization of the international conference Trends in Mathematical Applications in Tunisia, Algeria and Morocco (TAM-TAM) which held at Tlemcen 23-27 February 2019. **President of the organizing committee.**

International Awards

1- Ovide Arino Prize 2004: Attributed by Tlemcen university,
   « Méthode Multicouche Appliquée à la Dynamique d'une Population Marine. »

2- Award of the best publication of the year 2008. Attributed by Spanish Society of Applied Mathematics (SEMA) for the publication : Analysis of a cell system with finite divisions, Bol. Soc. Esp. Mat. Apl. N 44, (2008), 53-77. https://sema.pacifico-meetings.com/en/anteriores-galardonados-premio-sema-journal-2

3- Audin Prize 2012 : Attributed by The Maurice Audin Association, Paris, France. https://www.ljll.math.upmc.fr/AUDIN/web/palm.htm

4- Founding member of the Algerian Academy of Sciences and Technologies, 2015.