

Farzad Didehvar

Department of Mathematics & Computer Science  
Amir Kabir University of Technology (Tehran Polytechnic)

Tehran, Iran

Languages: Persian, English, French

## **Objective**

**I am a mathematician whose Fields of interest are**

- 1. Theoretical Computer Science, Theory of Computation, Algorithm (Logical, Mathematical, Philosophical and Physical aspects)**
- 2. The Application of Mathematics in Computer Science and Modeling**
- 3. Developing Algorithms**

**I start with Theoretical aspects in Computer Science but in Amir Kabir University I experience some more practical subjects to guide Computer Scientists Students. But My major interests remain in Theoretical Computer Science.**

**I try to find some models of reality in which we have a more suitable situation for Complexity Theory and adopt more to the Physical world. The major result is demonstrated in the second major project as it is shown in the second Major project as it is described in below.**

Education:

Ph.D: Mathematics (Computer Science & Logic)  
IPM-Institute for Research in Fundamental Sciences  
Tehran, Iran

MS.c: Mathematics (Logic)  
Sharif University of Technology  
Tehran, Iran

BS.c: Mathematics  
Sharif University of Technology  
Tehran, Iran

Diploma: Mathematics & Physics  
Tehran, Iran  
36 over >100,000

## *Thesis: Some Concepts and Problems in Theory of Complexity in Structures*

Supervisor: Mohammad Ardeshtir

### **The Courses:**

**Computability Theory (Graduate):**

**Complexity Theory (Graduate):**

**Some Topics in Theory of Computation (Graduate):**

**Computability Theory (Undergraduate):**

**Foundation of Logic & Set Theory (Undergraduate):**

**Some undergraduate courses:**

**Math I, Math II, Linear Algebra, ...**

### **The papers:**

36. Alireza Akbari Bayat, Farzad Didaver, Improved Parallel Universes Algorithm: An Evolutionary Algorithm For Combinatorial Optimization , International Journal of Industrial Engineering: Theory, Applications and Practice, Vol 27, No 4 ,2020

35. Hanieh Fallah Eslamloo, Farzad Didehvar, Farhad Rahmati, An Approximation algorithm for the balanced capacitated minimum spanning tree problem, SCIENTIA IRANICA TRANSACTION D, 2020

34. Hanieh Fallah Eslamloo, Farzad Didehvar, Farhad Rahmati, Approximation Algorithm for the load balanced capacitated Vehicle Routing Problem, Bulltin of the Iranian Mathematical Society, 2020

33. Saeed Asaeedi, Farzad Didehvar, Ali Mohades Khorasani, NLP formulation for polygon optimization problems, Mathematics December 2019, Volume7, Issue 1, Page1-25

32. Hajar Ghahremani Gol, Farzad Didehvar, Asadollah Razavi, "A Distance Function for Computing on Finite Subsets of Euclidean Spaces", ACTA MATHEMATICAE APPLICATAE SINICA-ENGLISH SERIES, January 2018 Vol. 34, Num. 1, Page 197-208, January 2018,

31. Saeed Asaeedi, Farzad Didehvar, Ali Mohades Khorasani, "?-Concave hull, a generalization of convex hull", THEORETICAL COMPUTER SCIENCE, November 2017 Vol. 702, Num. 1, Page 48-59, November 2017,

30 Hajar Ghahremani Gol, Assadolah Razavi, Farzad Didehvar, "On Intrinsic Properties of Ricci Flow Curve", IRANIAN JOURNAL OF SCIENCE AND TECHNOLOGY TRANSACTION A-SCIENCE, April 2017 Vol. 41, Num. 1, Page 237-241, April 2017,

29. Farnoosh Khodakarami, Farzad Didehvar, Ali Mohades Khorasani, "1.5D terrain guarding problem parameterized by guard range", THEORETICAL COMPUTER SCIENCE, January 2017 Vol. 661, Num. 0, Page 65-69, January 2017,

28. Yousef Seyfari, Farzad Didehvar, Hadi Banaee, Fatemeh Zare Mirakabad, "Evaluating the accuracy of splice site prediction based on integrating Jensen-Shannon divergence and a polynomial equation of order 2", International Journal of Computer Applications, October 2016 Vol. 151, Num. 5, Page 1-5, October 2016,

27. Majid Yousefi Khoshbakht, Azam Dolatnejad, Farzad Didehvar, Farhad Rahmati, "A Modified Column Generation to Solve the Heterogeneous Fixed Fleet Open Vehicle Routing Problem", *Journal of Engineering*, May 2016 Vol. 0, Num. 0, Page 1-13, May 2016,
26. Hajar Ghahremani Gol, Farzad Didehvar, Asadollah Razavi, "Vehicle routing problem for minimizing consumption of energy in three dimensional space", *Kuwait Journal of Science*, April 2016 Vol. 43, Num. 2, Page 139-150, April 2016,
25. Masoud Pourmahdian, Nazanin Roshandel Tavana, Farzad Didehvar, "Effective metric model theory", *MATHEMATICAL STRUCTURES IN COMPUTER SCIENCE*, December 2015 Vol. 25, Num. 8, Page 1779-1798, December 2015,
24. Farnoosh Khodakarami, Farzad Didehvar, Ali Mohades Khorasani, "A fixed-parameter algorithm for guarding 1.5D terrains", *THEORETICAL COMPUTER SCIENCE*, July 2015 Vol. 595, Num. 1, Page 130-142, July 2015,
23. Majid Yusefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "A Mixed Integer Programming Formulation for the Heterogeneous Fixed Fleet Open Vehicle Routing Problem", *Journal of Optimization in Industrial Engineering*, July 2015 Vol. 8, Num. 18, Page 37-46, July 2015,
22. Ebrahim Zarei Zefreh, Farzad Didehvar, Nasrin Nasrabadi, "A Hybrid Iterative Algorithm For Reconstruction Of X-Ray Computed Tomography", *MALAYSIAN JOURNAL OF COMPUTER SCIENCE*, June 2015 Vol. 28, Num. 1, Page 46-58, June 2015,
21. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "An Effective Rank Based Ant System Algorithm for Solving the Balanced Vehicle Routing Problem", *International journal of industrial engineering - Theory Applications and Practice*, February 2015 Vol. 23, Num. 1, Page 45-55, February 2015,
20. Ebrahim Zarei Zefreh, Farzad Didehvar, Ali Rajaei, "Accelerated Iterative Algorithms in Reconstruction of Computerized Tomography Images", *International Journal of Engineering and Technology*, May 2014 Vol. 2, Num. 2, Page 146-158, May 2014,
19. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "An Efficient Solution for the Vehicle Routing Problem by Using a Hybrid Elite Ant System", *INTERNATIONAL JOURNAL OF COMPUTERS COMMUNICATIONS & CONTROL*, March 2014 Vol. 9, Num. 3, Page 340-347, March 2014,
18. Sattar Sattari, Farzad Didehvar, "Variable Neighborhood Search Approach for the Minimum Routing Cost Spanning Tree Problem", *International Journal of Operations Research*, February 2014 Vol. 10, Num. 4, Page 153-160, February 2014,
17. Majid Yousefi Khoshbakht, Mohammad Sedighpour, Vahid Ahmadi, Farzad Didehvar, Farhad Rahmati, "Solving the Open Vehicle Routing Problem by a Modified Ant Colony Optimization", *KUWAIT JOURNAL OF SCIENCE & ENGINEERING*, December 2013 Vol. 40, Num. 3, Page 12-32, December 2013,
16. Saeed Asaeedi, Farzad Didehvar, Aliakbar Safilian, "Enumeration Order Equivalence in Rational Numbers", *Computer Technology and Application*, November 2013 Vol. 4, Num. 11, Page 615-619, November 2013,
15. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "Solving the heterogeneous fixed fleet open vehicle routing problem by a combined metaheuristic algorithm", *INTERNATIONAL JOURNAL OF PRODUCTION RESEARCH*, November 2013 Vol. 51, Num. 24, Page 1-11, November 2013,
14. Majid Yousefi Khoshbakht, Shahrood Azami, Farzad Didehvar, Farhad Rahmati, "An Ant Colony algorithm hybridized with insert and swap heuristics for the Vehicle Routing Problem with Time Windows", , October 2013 Vol. 9, Num. 4, Page 15-30, October 2013,
13. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "An Improved Modified Tabu Search Algorithm to Solve the Vehicle Routing Problem with Simultaneous Pickup and Delivery", *Journal of Advances in Computer Research*, May 2013 Vol. 3, Num. 4, Page 55-66, May 2013,
12. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "Modification of the Elite Ant System in Order to Avoid Local Optimum Points in the Traveling Salesman Problem", *WULFENIA*, September 2012 Vol. 19, Num. 9, Page 181-195, September 2012,

11. Majid Yousefi Khoshbakht, Farzad Didehvar, Farhad Rahmati, "A Hybrid Ant Colony System for the Heterogeneous Fleet Vehicle Routing Problem", , September 2012 Vol. 9, Num. 2, Page 191-207, September 2012,
10. Mahtab Sadat Hoseini Nia, Mirmehdi Seyed Esfahani, Farzad Didehvar, Asghar Haghi, "Inventory competition in a multi channel distribution system: The Nash and Stackelberg game", SCIENTIA IRANICA TRANSACTION E-INDUSTRIAL ENGINEERING, July 2012 Vol. 20, Num. 3, Page 846-854, July 2012,
9. M. Yousefikhoshbakht, Farzad Didehvar, Farhad Rahmati, M. Sedighpour, "An Effective Imperialist Competitive Algorithm for Solving the Open Vehicle Routing Problem", , May 2012 Vol. 9, Num. 1, Page 20-34, May 2012,
8. Roghayeh Alami, Mohammad Ebrahim Shiri Ahmad Abady, Farzad Didehvar, Zeinab Hajimohammadi, "NEW FACIAL FEATURE LOCALIZATION ALGORITHM USING ADAPTIVE ACTIVE SHAPE MODEL", INTERNATIONAL JOURNAL OF PATTERN RECOGNITION AND ARTIFICIAL INTELLIGENCE, February 2012 Vol. 26, Num. 1, Page 0-0, February 2012,
7. Majid Yousefikhoshbakht, Farzad Didehvar, Farhad Rahmati, "Application a Modified Imperialist Competitive Algorithm for Solving the Traveling Salesman Problem", , January 2012 Vol. 1, Num. 2, Page 29-49, January 2012,
6. Nazanin Roshandel, Masoud Pourmahdian, Farzad Didehvar, "Compactness in First Order Lukasiewicz Logic", LOGIC JOURNAL OF THE IGPL, September 2011 Vol. 0, Num. 0, Page 0-0, September 2011,
5. Farzad Didehvar, Kaveh Ghasemlou, Masoud Pourmahdian, "Effectiveness in RPL, with applications to continuous logic", ANNALS OF PURE AND APPLIED LOGIC, March 2010 Vol. 161, Num. 6, Page 788-799, March 2010,
4. Farzad Didehvar, Ali Mehrabi, Fatemeh Raei, "On Unique Independence Weighted Graphs", International Journal of Contemporary Mathematical Sciences, May 2009 Vol. 1, Num. 531, Page 257-264, May 2009,
3. Farzad Didehvar, Changiz Eslahchi, "An algorithm for rank aggregation problem", APPLIED MATHEMATICS AND COMPUTATION, June 2007 Vol. 189, Num. 1, Page 1847-1858, June 2007,
2. Shahriar Arab, Farzad Didehvar, Changiz Eslahchi, Mahdi Sadeghi, "Helix segment assignment in proteins using fuzzy logic", Iranian Journal of Biotechnology, May 2007 Vol. 5, Num. 2, Page 93-99, May 2007,
- 1.** Farzad Didehvar, "On a Class of Recursively Enumerable Sets", MATHEMATICAL LOGIC QUARTERLY, September 1999 Vol. 45, Num. 4, Page 467-470, September 1999

## SOME CONFERENCES

1. Quantum Computing an application, A Two-Day Seminar on Mathematical Logic, IPM, 14/10/84
2. Group Decision Making, 19th British Combinatorial Conference University of Wales, Bangor, England (with Changiz Eslahchi)
3. Rapid Elimination of Quantifiers, LOGIC COLLOQUIUM 2002  
, Munster, Germany, 2002 (With Dr Mohammad Ardeshtir)
4. Theory of computation as time passes, Mind, Logic and Computation, 2012/6/23
5. Two New reducibilities Based on Enumeration Orders, Turing Centenary Conference CIE 2013, Cambridge, England (with Aliakbar Safilian, the lecturer)
6. A Short History of Theory of Computation, Winter School on Computational Geometry, 2018/ 3 month/5 day

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7. An approximation algorithm for a Heterogeneous Capacitated Vehicle Routing Problem, The 46<sup>th</sup> Annual Iranian Mathematics Conference, Yazd, Iran 2015, 8, 28 (with Hanieh Falah Eslamlou (lecturer), Farhad Rahmati)
8. Solving generalized vehicle routing problem by parallel universes and Tabu search, . 6<sup>th</sup> International Conference on Computing, Communication and Networking Technologies (ICCCNT), 2015/7/13-15, United State, Washington
9. A Fixed Parameter Algorithm for Guarding 1.5D Terrains, 23rd European Workshop on Computational Geometry- EWCG 2012, Perugia, Italy, 2013/2/16, (with Farnoush Khakarami (Lecturer), Ali Mohades Khorasani)
10. A Metaheuristic Algorithm for the Minimum Routing Cost Spanning Tree Problem, In Proc. 2nd International Conference on Operations Research and Optimization, Tehran, Iran, 2013, (with Sattar Sattari (Lecturer)),
11. Finding Nash and Stackelberg Equilibrium for Warehouse Inventory in Supply Chain Management, 4<sup>th</sup> The World Congress of the Game Theory Society, Istanbul, Turkey, 2012/8/4, (with Asghar Haghi (Lecturer), Mir Mehdi Seyyed Esfahani)
12. Enumeration order Complexity Equivalence, Antalya, Turkey, Second World Conference on Information Technology WCIT 2011, (With Saeed Asaeedi)
13. When the proof doesn't show the Truth, Philosophy Day in Iran (Logic and Philosophical Logic Tradition and Modern, 2010/11/19, Tehran, Iran)
14. On Unique Independence Weighted Graphs, Combinatorics and graphs : the twentieth anniversary conference of IPM, Tehran, Iran, 2009/8/16 (With Ali Mehrabi, Fatemeh Ra'ei (lecturer))
15. Fast Convergence of Iteration Methods in Reconstruction of Computed Tomography Images, 42<sup>th</sup> Conference of Iranian Mathematics, 2011/9/5, Rafsanjan, Iran, ( with Ebrahim Zareei Zefreh lecturer)
16. face recognition using local multi dimensional statistics, international csi computer conference csicc09, 2009/11/18
17. K compactness in the first order fuzzy logics, 39<sup>th</sup> Conference of Iranian Mathematics, 2008/8/24 (With Masoud Pourmahdian, Nazanin Roshandel Tavana (Lecturer))
18. The Analytical Application of Fourier in solving Inverse Tomography Computational, 42<sup>th</sup> Conference of Iranian Mathematics, Rafsanjan, Iran, (With Ebrahim Zefreh)
19. A Semantic Situation without Syntax (Non-axiomatizability of Theories), Universal Logic 2015 (5<sup>th</sup> World Congress and school), 2015/6/28, Istanbul, Turkey, Istanbul University,
20. Is Classical Mathematics Appropriate for Theory of Computation?, Universal Logic 2018 (6<sup>th</sup> World Congress and school), 2018/6/28, Vichy, France, Vichy University Campus
21. Fuzzy time, from paradox to paradox, The 50<sup>th</sup> Annual Iranian Mathematics Conference, Shiraz, Iran, Shiraz University, 26-29 August, 2019, Shiraz University

22. The impacts of Logic, Paradoxes in one side and Theory of Computation in the other side (Fuzzy Time, Theory of Fuzzy Time Computation, Monday, 20 June 2022 (In persian),  
<https://ialogic.ir/index.php/2022-12-11-17-07-09/lectures/258-2022-06-15-05-07-35>

23. About a Proof (  $\mathbf{TC} + \mathbf{CON}(\mathbf{TC}^*) \vdash (\mathbf{P} \neq \mathbf{NP})$ ), The 10th annual conference of the Iranian Logic Association, February 22, 2023 - February 23, 2023

Address of abstract book

[https://ialogic.ir/images/seminars/Yearly/10th-1401/%DA%86%DA%A9%DB%8C%D8%AF%D9%87\\_%D9%85%D9%82%D8%A7%D9%84%D8%A7%D8%AA\\_%D9%87%D9%85%D8%A7%DB%8C%D8%B4\\_%D8%AF%D9%87%D9%85/Farsi\\_-2622023.pdf](https://ialogic.ir/images/seminars/Yearly/10th-1401/%DA%86%DA%A9%DB%8C%D8%AF%D9%87_%D9%85%D9%82%D8%A7%D9%84%D8%A7%D8%AA_%D9%87%D9%85%D8%A7%DB%8C%D8%B4_%D8%AF%D9%87%D9%85/Farsi_-2622023.pdf)

24. Turing Machines Equipped with CTC in Physical Universes, Sara Babaei, Farzad Didehvar, presented by Sara Babaei (in Persian). The 10th annual conference of the Iranian Logic Association, February 22, 2023 - February 23, 2023

[https://ialogic.ir/images/seminars/Yearly/10th-1401/%DA%86%DA%A9%DB%8C%D8%AF%D9%87\\_%D9%85%D9%82%D8%A7%D9%84%D8%A7%D8%AA\\_%D9%87%D9%85%D8%A7%DB%8C%D8%B4\\_%D8%AF%D9%87%D9%85/Farsi\\_-2622023.pdf](https://ialogic.ir/images/seminars/Yearly/10th-1401/%DA%86%DA%A9%DB%8C%D8%AF%D9%87_%D9%85%D9%82%D8%A7%D9%84%D8%A7%D8%AA_%D9%87%D9%85%D8%A7%DB%8C%D8%B4_%D8%AF%D9%87%D9%85/Farsi_-2622023.pdf)

## PhD students

1. *Nazanin Roshandel Tavana, Many-valued Logics: Model theoretic and effectiveness point of view, 2012 (With Dr M.Pourmahdian)*
2. *YousefiKhoshbakht Majid, Modeling and Development of Efficient Methods for the Approximate Solution for the Heterogeneous Fixed Fleet Open Vehicle Routing Problem, 2014 (With Dr F.Rahmati)*
3. *Hajar Ghahramanigol, Ricci Flow in the Manifold of Riemannian Metrics and some Applications in Computer Science, 2015 (With Dr A.Razavi)*
4. *Farnoosh Khodakarami, The art of Parameterization for some Computational Geometric Problems, 2017*
5. *Saeed Asaeedi, Generalization of Convex Hull Using Arbitrary Angles, 2019*
6. *Hanieh Fallah Eslamloo, Approximation Algorithms for some Vehicle Routing Problems, 2020*

## MSc Thesis

#

Thesis title

By

**Date**

1

Big data face recognition using kernel sparse representation  
Mojtaba Amiri Royandazag & Farzad Didehvar  
July 2020

2

An improved algorithm for rank aggregation problems  
Sadra Mohammadshirazi & Farzad Didehvar  
September 2019

3

Computability on finite state machines  
Anoush Siahkar & Farzad Didehvar  
March 2019

4

The Complexity Of Computing a Nash Equilibrium And Approximation Algorithms  
Koosha Samieefar & Farzad Didehvar  
October 2018

5

Modelling and computation of social disintegration and reintegration  
Maryam Shariatmadari & Farzad Didehvar  
May 2018

6

Prediction and diagnosis Ductal Carcinoma and its computational problems  
Mohammad Bodaghi & Farzad Didehvar  
April 2018

7

Solving constrained vehicle routing problems by applying quantum computation  
Pedrom Jafari Qumi & Farzad Didehvar  
October 2017

8

Steganography in HTTP/2 Protocol using multimedia padding  
Ali Abed Saadoon Al-Omairi & Farzad Didehvar  
September 2017

9

A multi-source paraconsistent framework for belief revision  
Shahab Ebrahimi & Farzad Didehvar  
January 2017

10

Cancer Cells diagnosis using image processing and machine learning techniques  
Abbas Eslami & Farzad Didehvar  
June 2016

11

consensus folding prediction of unaligned RNA sequences  
Mohamadreza Vahedi & Farzad Didehvar  
February 2016

12

A metaheuristic method for vehicle routing problems with time windows  
Fahime Yarmohammadi & Farzad Didehvar  
February 2016

13

Controllability Discovery of Biological Networks  
Farbod Farhour & Farzad Didehvar  
February 2016

14

Applying modification ant colony method for generalized vehicle routing problem  
Mohammadhossein Navidadham & Farzad Didehvar  
February 2015

15

Object recognition inspired by mechanism visual system  
Lida Sabbaghzadeh Ghomi & Farzad Didehvar  
February 2015

16  
parallel universes algorithm a metaheuristic VRP approach to solve vehicle routing problem  
Alireza Akbari Bayat & Farzad Didehvar  
October 2014

17  
Multiclass object recognition with universal dictionary of visual features  
Zahra Daraei Baf & Farzad Didehvar  
October 2014

18  
Augmented lagrangian ant colony and artificial bee colony based methods for constrained optimization problems  
Asghar Mahdavi & Farzad Didehvar  
October 2014

19  
covering subsets of natural numbers(N) by computational sets and computational enumerable sets  
Mohsen Mansuri & Farzad Didehvar  
October 2013

20  
Steganography in image using multi-resolution transforms  
Reyhaneh Heydarzadeh Rizi & Farzad Didehvar  
October 2013

21  
analyzing the vehicle routing problem with time windows using modified genetic algorithm  
Mehdi Behzadimanesh & Farzad Didehvar  
October 2013

22  
IDS Designing by game theory and machin learning  
Mohammad Hadi Aliakbar & Farzad Didehvar  
October 2013

23  
BLIND STEGANALYSIS OF IMAGES  
Zahra Taheri & Farzad Didehvar  
October 2013

24  
Developing some metaheuristic algorithms for minimum routing cost spanning tree problem  
Sattar Sattari & Farzad Didehvar  
January 2013

25  
Graph clustering via mixture model  
Raheleh Namayandeh & Farzad Didehvar  
November 2012

26  
Analysis of motif finding algorithms in biological sequences  
Delaram Poudei & Farzad Didehvar  
November 2011

27  
Gene prediction algorithms  
Yousef Seyfari & Farzad Didehvar  
October 2011

28  
Text simplification with antology extraction and pattern recognition  
Naeem Paeedeh & Farzad Didehvar  
October 2011

29  
Inventory competition in multi agent systems the stackelberg game  
Asghar Haghi & Farzad Didehvar  
October 2011

30  
Human recognition using face biometric  
Zeinab Hajimohammadi & Farzad Didehvar  
October 2011

31



Agent -based modeling of collective behavior in complex systems  
 Danial Qaurooni-Fard & Farzad Didehvar  
 February 2011  
 32  
 Investigation the enumeration order in natural and real numbers sets  
 Saeed Asaeedi & Farzad Didehvar  
 November 2010  
 33  
 Skill learning in hierachichal reinforcment learning in discrete semi-markov decision  
 Farhad Sarvari & Farzad Didehvar  
 November 2010  
 34  
 prediction of tertiary structure of protein using geometry properties  
 Leila Ghanbari & Farzad Didehvar  
 February 2010  
 35  
 introducing a formulization of concept learning and investigating its comprehensiveness in statistical and computational models  
 Mohammadreza Abolghasemi Dehaghani & Farzad Didehvar  
 December 2009  
 36  
 Human identification using biometric face  
 Roghayeh Alami & Farzad Didehvar  
 November 2009  
 37  
 analysis the weihrauch approach in computable analysis  
 Ali Akbar Safilian & Farzad Didehvar  
 November 2009  
 38  
 Designing a model for inventory management in multi channel distribution system of supply chain with game theory  
 Mahtab Sadat Hoseini Nia & Farzad Didehvar  
 February 2009  
 39  
 Proof complexity  
 Sharar Ahmadi & Farzad Didehvar  
 September 2008  
 40  
 Mechanism design and winner determination problems in combinatorial auctions from the perspective of algorithmic game theory  
 Ehsan Iranmanesh & Farzad Didehvar  
 July 2008  
 41  
 Motion planning using by visibility voronoi complex  
 Abolalfazl Pooreidi & Farzad Didehvar

### Some Activities:

1. Taking Part in establishment Of Bioinformatics Society of Iran (One of the members)  
<https://ibis.org.ir/%D8%AF%D8%B1%D8%A8%D8%A7%D8%B1%D9%87-%D8%A7%D9%86%D8%AC%D9%85%D9%86/>
2. Taking Part in bioinformatics project as a subject of study in University of Tehran,
3. Taking part in writing National High School books to study Mathematics of high school, (2004-2010)
4. Taking part in writing National High School book (Directly) (2008-2009)  
<http://chap.sch.ir/sites/default/files/books/93-94/104/000-C211-1.pdf>,
5. Organizer of The First Logic Day in Iran, January 14, 2019

6. Organizer of The Second Logic Day in Iran, January 14, 2020
7. Organizer of The Third Logic Day in Iran, January 14, 2021
8. Organizer of The 10<sup>th</sup> Annual Conference of the Iranian Logic Association, (With Seyed Ahmad Mirsanei), February 22, 2023 - February 23, 2023

### The Major Projects:

**2.** The second major project is continuation of my PhD thesis about P vs NP problem. The following text demonstrates it in brief.

In [5], [8], [10], [11] we obtain some results that could be summarized as following:

1.  $TC + CON(TC^*) \vdash P \neq NP$  [11]
2.  $TC^* \vdash P^* \neq NP^*, P^* = BPP^*$  [5],[8]
3.  $\neg CON(TC)$  [10]

In above, by TC we mean the theorems in Theory of Computation and by  $TC^*$  the theorems in Theory of Computation when we consider the instants of time as fuzzy numbers [5], [8], [11]. Respectively, we define the classes  $P^*$ ,  $NP^*$ ,  $BPP^*$ . By CON (T) for a theory T we mean this theory is consistent and the existence of at least a model which theory holds in that. If we consider QM as the collection of theorems in Quantum Mechanics, the following assertion seems true by [9]

9.  $CON(QM) \rightarrow CON(TC^*)$  (The proof is not exact in detail yet)

In the related discussion, we have proven these four assertions [5], [8], [9], [11]. Remark. Because of 3, the importance of the first result (proved in the last chapter of [11]) would be under question, unless we consider Non –classical logics. Nevertheless, by 2 we observe that considering time as a fuzzy concept leads us to a convenient situation in Theory of Computation. Time is a central concept in Physics. To consider it as a fuzzy concept leads us to some changes in Theory of Physics and introducing a new interpretation of Quantum Mechanics so called “Fuzzy time-Particle interpretation” of Quantum Mechanics [4], [6], [9]. Here, we should mention “Probabilistic Time” by C. Witterich [2] and a related work E.C. Ruiz et al. in [3]. Actually, to consider time as an operator in Physics doesn’t seem a new idea but somewhat they didn’t take it serious in a level to be considered as a central concept. Possibly, the problem is somewhat psychological. More exactly, psychologically, there is a large inertia to accept non classical time. Historically, Brouwer and Husserl had a similar idea when they knew instants of time as engaged links of a chain [7], [13], [14]. By the way, Fuzzy Mathematics and Quantum Mechanics major commonality is “uncertainty”. Based on this fact, there are attempts to consider the theories of “Fuzzy Time space”, for Physics in general and Quantum Mechanics [1]. On contrast, in our approach we have a specific reason to consider time as a fuzzy concept[4], [7], [10]. Besides all, here the Fuzzy function associated to the instants of time are computable. As the third factor, we show not only Physics but also Theory of Computation and any Theory based on Classical time need to be reconsidered in order to be modified. Therefore, it is required to define a novel interpretation in Physics [4], [6], [9]. As a motto we have: “We have

sufficient evidences in Physics and Theory of Computation to accept time as a fuzzy concept”. Conclusion. TC in Complexity Theory part and different subjects in cryptography has major problems. More exactly, there is a long list of unsolved problems in these subjects. As an example, even a problem like  $P=PSPACE$  has not been solved yet. We suggested the major difficulty of these problems is around the concept of time. By focusing on  $TC^*$  instead of TC as we see in [11], seemingly we reach to a much better situation for Theory. In [11], the structure of the new theory is described.

## References

1. B.G. Sidharth, The Fuzzy Space Time Paradigm, 2003 arxiv Physics/0311040
2. C. Wetterich, Probabilistic time, Foundations of Physics, 2012, Springer
3. E.C. Ruiz, F.g., C.Brukner, Entanglement of Quantum Clocks through Gravity, PNAS March 2017
4. F. Didehvar, About Fuzzy Time-Particle interpretation of Quantum Mechanics (It is not an innocent one), version one, Philpaper 2019
5. F. Didehvar, By Considering Fuzzy Time,  $P=BPP$  ( $P^*=BPP^*$ ), Philpaper, Researchgate doi: 10.13140/RG.2.2.16257.07521, 2020
6. F.Didehvar, Double Slit Experiment About Fuzzy Time –Particle Interpretation of Quantum Mechanics, Philpaper 2019
7. F. DIDEHVAR, “Fuzzy time”, a solution of Unexpected Hanging Paradox (a Fuzzy interpretation of Quantum Mechanics), Philpaper 2019
8. F. Didehvar, Fuzzy Time & NP Hardness ( $P^*=BPP^*$ ,  $P^* \neq NP^*$ ), Philpaper, 2020
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**1.** Are we Computational Machines? I had some research and the results are:

1. "I never could be certain that I am a machine". [1]
2. Some results about definability of I. [2]
3. "I never could be certain that mind is a machine". [3]

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