

# CURRICULUM VITAE

for

**Manouchehr Zaker**

**DATE & PLACE OF BIRTH:** September 19, 1971 - Tehran, Iran

**POSITION:** Professor of Mathematics

## CURRENT ADDRESS

Institute for Advanced Studies in Basic Sciences (IASBS)

Department of Mathematics, 45195-1159, Zanjan, IRAN.

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## EDUCATION

University of Tabriz, Tabriz,

B.S. in pure mathematics in 1994.

Sharif University of Technology, Tehran,

M.S. in pure mathematics in 1997.

M.S.thesis:

*Defining sets in vertex coloring of graphs and Latin rectangles*

Sharif University of Technology, Tehran,

Ph.D. in mathematics in 2001.

Major field: Combinatorics and Graph Thoery

Minor field: Advanced Algorithms and Computational Complexity

Ph.D. thesis:

*On-line Greedy Colorings and Grundy Number of Graphs*

Supervisor: E. S. Mahmoodian.

## HONORS

- Outstanding graduate student in Sharif University of Technology 2001
- Distinguished researcher in Zanjan province 2008
- Distinguished researcher in Zanjan province 2010

## **TEACHING**

- Graph Theory (Bondy, Murty 2008 + Diestel 2001)
- Algorithmic Graph Theory (My own notes)
- Probabilistic Methods in Graph Theory (Molloy, Reed 2002 + My own notes)
- Random Graphs (Janson, Luszczak and Rucinski 2000)
- Coding theory: Source coding, data compression and error correcting codes (My own lecture note)
- Cryptography: Public key cryptography and secret sharing schemes (Stinson 2000)
- Advanced Algorithms for Computer Science students

## **Ph.D. STUDENTS**

- Fateme Mousavi, graduated in 2010 from IASBS (advisor)
- Saeed Shabani, graduated in 2012 from IASBS (advisor)
- Hossein Soltani, graduated in 2014 from IASBS (supervisor)
- Mitra Nemati, graduated in 2014 from IASBS (supervisor)
- Kaveh Khoshkhan, graduated in 2014 from IASBS (supervisor)
- Nahideh Asadi, IASBS (supervisor)
- Abbas Khalegi, IASBS (supervisor)
- Zoya Masih, IASBS, (supervisor)

## **EXECUTIVE POSTS**

- Chair of Mathematics and Computer Science department in IASBS (2009 - 2011)
- Member of the research committee of IASBS (2006 - 2009)
- Representative of the Mathematics department in MONTAKHAB committee (2006 - )
- Editor of the journal “Transactions in Combinatorics”, 2011
- Member of the scientific committee of the 2nd Seminar on Financial Math. and Mathematics of Social Networks, IASBS, February 2011
- Member of the executive committee of the International Workshop on Grobner Basis and Applications, IASBS, June 2004
- Member of the scientific committee of 38th annual Iranian mathematics conference, Azarbaijan university, September 2007
- Organizer of the Seminar on Combinatorics, IASBS, February 2002

## RESEARCH FIELDS

- Graph Theory
- Combinatorics
- Algorithmic and Probabilistic Graph Theory
- Social Networks Analysis by Discrete Mathematics
- Foundations and Philosophy of Mathematics
- History and Education of Science and Mathematics
- Personality Typology and Typology of Mathematicians
- Cognitive Scientific Approach to Mathematics

## PUBLICATIONS

1. E.S. Mahmoodian, R. Naserasr, and M. Zaker, *Defining sets in vertex colorings of graphs and latin rectangles*, Discrete Math. **167/168** (1997) 451–460.
2. H. Hajiabolhassan, M.L. Mehrabadi, R. Tuserkani, and M. Zaker, *A characterization of uniquely vertex colorable graphs using minimal defining sets*, Discrete

Math. **199** (1999) 233–236.

**3.** M. Zaker, *Greedy defining sets of graphs*, Australasian Journal of Combinatorics, vol. **23** (2001) 231–235.

**4.** M. Zaker, *The Grundy chromatic number of the complement of bipartite graphs*, Australasian Journal of Combinatorics, vol. **31** (2005) 325–330.

**5.** M. Zaker, *Results on the Grundy chromatic number of graphs*, Discrete Math. **306** (2006) 3166–3173.

**6.** M. Kouider and M. Zaker, *Bounds for the b-chromatic number of some families of graphs*, Discrete Math. **306** (2006) 617–623.

**7.** M. Zaker, *Greedy defining sets in graphs and Latin squares*, Electronic Notes in Discrete Math. **24** (2006) 299–302.

**8.** M. Zaker, *Maximum transversal in partial Latin squares and rainbow matchings*, Discrete Applied Math. **155** (2007) 558–565.

**9.** M. Zaker, *Inequalities for the Grundy chromatic number of graphs*, Discrete Applied Math. **155** (2007) 2567–2572.

**10.** M. Zaker, *Greedy defining sets in Latin squares*, Ars Combinatoria **89** (2008) 205–222.

**11.** M. Zaker, *New bounds for the chromatic number of graphs*, J. Graph Theory **89** (2008) 110–122.

**12.** M. Zaker, *More results on greedy defining sets*, Ars Combinatoria (2014).

**13.** M. Zaker, *Some results for chromatic and coloring number of graphs*, The proceedings of 40th Annual Iranian Mathematics Conference, Sharif university Press (2009) 633–635.

**14.** M. Zaker, *Bounds for chromatic number in terms of even-girth and booksize*, Discrete Math. **311** (2011) 197–204.

**15.** A. Gyárfás, M. Zaker, *On  $(\delta, \chi)$ -bounded families of graphs*, The Electronic Journal of Combinatorics **18** (2011), #P108.

**16.** M. Zaker, *On lower bounds for the chromatic number in terms of vertex degree*, Discrete Math., **311** (2011) 1365–1370.

**17.** M. Zaker, *On dynamic monopolies of graphs with general thresholds*, Discrete Math. **312** (2012) 1136–1143.

**18.** K. Khoshkhah, H. Soltani, M. Zaker, *On dynamic monopolies of graphs: the average and strict majority thresholds*, Discrete Optimization **9** (2012) 77–83.

**19.** M. Zaker, *Generalized degeneracy, dynamic monopolies and maximum degener-*

ate subgraphs, Discrete Applied Math., **161** (2013) 2716-2723.

**20.** K. Khoshkhah, M. Nemati, H. Soltani, M. Zaker, *A study of monopolies in graphs*, Graphs and Combinatorics **29** (2013) 1417–1427.

**21.** M. Zaker, *Extensions to  $\lambda$ -coloring of graphs with emphasis on  $K_n \square K_n$* , Submitted.

**22.** M. Zaker, H. Soltani, *First-Fit colorings of graphs with no cycles of a prescribed even length*, Journal of Combinatorial Optimization, in press 2015.

**23.** K. Khoshkhah, H. Soltani, M. Zaker, *Dynamic monopolies in directed graphs: spread of unilateral influence in social networks*, Discrete Applied Math. **171** (2014) 81–89.

**24.** H. Soltani, M. Zaker, *Dynamic monopolies with probabilistic thresholds*, Bulletin of Australian Mathematical Society **90** (2014) 363-375.

**25.** M. Nemati, M. Zaker, *Weak dynamic monopolies in social graphs*, accepted for publication in Utilitas Mathematica 2013.

**26.** H. Soltani, M. Zaker, *Partial vertex cover and the complexity of some monopoly problems*, accepted for publication in Utilitas mathematica 2014.

**27.** K. Khoshkhah, M. Zaker, *On the largest size of minimum dynamic monopolies with given average thresholds*, Canadian Mathematical Bulletin, **58** (2015) 306–316.

**28.** M. Zaker, *Lower bounds for the independence and  $k$ -independence number of graphs*, under revision for publication in Discrete Appl. Math 2015.

**29.** M. Zaker, *More visual cryptography schemes for graph based access structure and a matricial representation of graphs*, Submitted 2015.

**30.** M. Zaker, *First-Fit coloring of Cartesian product graphs and its defining sets*, Submitted 2015.

**31.** Z. Tang, B. Wu, L. Hu, M. Zaker, *More bounds for the Grundy number of graphs*, Submitted 2015.

**32.** M. Zaker,  *$(\delta, \chi_{FF})$ -bounded families of graphs*, Submitted 2015.

## HOT PAPERS and CITATIONS

- 4-th rank in TOP 25 papers of Discrete Math. for “Bounds for the  $b$ -chromatic number of some families of graphs” in 2006
- 21-st rank in TOP 25 papers of Discrete Math. for “Results on the Grundy

chromatic number of graphs” in 2006

- 21-st rank in TOP 25 papers of Discrete Applied Math. “Maximum transversal in partial Latin squares and rainbow matchings” in 2007
- 8-st rank in TOP 10 papers of Discrete Math. “On lower bounds for chromatic number in terms of vertex degree” in 2011
- One year free subscription of Journal of Graph Theory for “New bounds for the chromatic number of graphs” in 2008
- Mostly cited paper in Discrete Optimization among all papers published from 2010: *On dynamic monopolies of graphs: the average and strict majority thresholds*, Discrete Optimization **9** (2012) 77–83.
- CITATIONS in Mathscinet 112 times by 130 authors (in April 2015)
- CITATIONS in Scopus 151 times
- Erdős Number 2

## REFEREED PAPERS FOR JOURNALS

- Discrete Mathematics (USA)
- Discrete Applied Mathematics (USA)
- Discrete Mathematics and Theoretical Computer Science (FRANCE)
- Journal of Graph Theory (USA)
- Journal of Combinatorial Designs (USA)
- Australasian Journal of Combinatorics (Australia)
- Graphs and Combinatorics (Japan)

## Visits

- From November 16 to 20 (2004) at the Institute Leibniz, IMAG, Grenoble, France.
- From November 20 to December 21 (2004) at Institute LRI, University of Paris-Sud, Orsay, Paris, based on a research grant from French government.
- From September 12 to 24 (2005) at the Advanced School on Recent Trends in Combinatorics, held in the institute CRM, Barcelona.

- From September 7 to 10 (2006) at Koc university in Istanbul, Turkey
- From September 18 to 21 (2006) at Gdansk technical university, Poland
- From October 21 to 27 (2007) at The ADONET-CIRM School on Graphs and Algorithms, Trento, Italy (supported by the school)
- From July 18-31 (2010) at Alfred Renyi institute of mathematics in Budapest, Hungary.
- From December 2013 to June 2014 at Mathematics department, University of Ulm, Ulm, Germany.

## CONFERENCE TALKS

1. *Minimal defining sets in vertex coloring of graphs*, Proceeding of the 28th Annual Iranian Mathematics Conference, Part 1 (Tabriz, 1997), 587–589, Tabriz Univ. Ser., 377, Tabriz Univ., Tabriz, 1997.
2. *New trends in graph colorings concerning greedy coloring*, Proceeding of the 31th Annual Iranian Mathematics Conference, (Tehran, 2000), Tehran.
3. *A variation of subgraph isomorphism problem and its applications*, Proceeding of Second Joint Seminar on Applied Mathematics organized by Baku State University and Zanzan University, (Zanzan, 2000).
4. *Results and problems in Grundy and First-Fit coloring of graphs*, The international workshop/conference on Combinatorics, Linear Algebra and Graph Coloring, Aug 9–14 2003 Institute for Studies in Theoretical Physics and Mathematics (IPM), (Tehran, 2003).
5. *Results on some coloring parameters of a graph*, The Fourteenth workshop on Cycles and Colourings (C&C05), Sept. 4–9 2005, Tatranska Strba, Slovakia.
6. *Bounds for the chromatic number of graphs*, IPM Combinatorics II, April 22–27 2006 Institute for Studies in Theoretical Physics and Mathematics (IPM), (Tehran, 2006).
7. *Greedy defining sets in graphs and Latin squares*, Fifth Cracow Conference on Graph Theory, Sept. 11–15 2006, Ustron, Poland.
8. *Results for the chromatic and First-Fit chromatic number of sparse graphs*, Enumeration and Probabilistic Method in Combinatorics, CRM, Sept. 15–21 2007, Barcelona, Spain.
9. *Bounds for chromatic number in terms of booksize of graphs*, Graph Theory 2008 (60-th birthday of Carsten Thomassen), Sept 2008, Sandbjerg Manor, Denmark.
10. *Some results for chromatic and coloring number of graphs*, 40-th Iranian Annual

Mathematics Conference, August 2008, Sharif University of Technology, Iran.

11. *An analysis of some problems in philosophy of mathematics using the theory of lebensform*, 40-th Iranian Annual Mathematics Conference, August 2008, Sharif University of Technology, Iran.

12. *A survey of results on First-Fit chromatic number*, October 2009, Minsk, Belarus.

13. *On  $(\delta, \chi)$ -bounded families of graphs*, March 2011, Seminar on Combinatorics in Isfahan University of Technology, Isfahan, Iran.

14. *On the dynamic monopolies and degeneracy of graphs*, December 2012, The first conference on theoretical aspects of computer science, IPM, Tehran, Iran.

15. *On degenerate degree sequence of graphs and its applications*, April 2015, IPM-CCC2015, IPM, Tehran, Iran.

#### ARTICLES IN OTHER FIELDS

1. M. Zaker, *On memory, loyalty and typology in ethical issues and theorization using Jungian functions of mind*, Philosophical Meditations, Vol. 3, No. 9, Spring 2013.

2. M. Zaker, *Necessity in Wittgenstein and an analysis in the domain of ethics*, Philosophical Newsletter, 18 (2009) page 11 Philosophical Newsletter (in Farsi).

3. M. Zaker, *Classification of mathematicians and an investigation of mathematical thoughts*, to be published in Farhang & Andisheh Riazi (by Iranian Mathematical Society).

4. M. Zaker, *The importance of differentiated mind cognitive functions for education with emphasis on mathematics and science*, in: Proceedings of the conference in philosophy of education, Kharazmi university, Tehran, October 2014.

5. M. Zaker, *Visuo-spatial intuition in mathematics and graph theory*, Submitted 2015 (in Farsi).