Name: Regina Ovodenko Date: 01.12.22

CURRICULUM VITAE

1. Personal Details

Date of Birth: 1971
Permanent Home Address: 4 Carmel St., Netanya, Israel
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2. Academic Background

Date: From-To	Institute	Degree	Area of specialization
2008 - 2016	Tel Aviv University	PhD	Math, Science, and Technology Education
2001 - 2005	Tel Aviv University	MA (summa cum laude)	Math, Science, and Technology Education
1999 - 2001	Tel Aviv University	Teaching Certificate	Math Education
1988 - 1993	Astrakhan State University	BA (summa cum laude)	Math, Science, and Technology Education

3. Post-Doctoral Studies

Period of Study	Name of Institution, Department and Host	Degree
October 2016 – September 2022	Haifa University, Math Education, Faculty of Education. Prof. Roza Leikin	Research associate: RANGE center – Interdisciplinary Center for Research and Advancement of Giftedness and Excellence

4. **<u>Previous Employment</u>** begin with present position (do not include students' tutoring, memberships in scientific associations or guest lectures)

Date: From-To	Institute	Title	Research Area
2020 - present	Kibbutzim College	Lecture	Mathematics Education
2016 - present	University of Haifa	Research coordinator in Stepped tasks program and Maof program in RANGE center	Mathematics Education
2004 - 2020	CET (Center of Educational Technology)	- Content Developer - Math education researcher	Mathematics Education
2016	Levinsky College of Education	Lecturer	Mathematics Education
2010 - present	Shenkar College of Engineering and Design	Lecture	Differential and Integral Calculus (A & B)
2005 - 2012	Tel Aviv University	Researcher	Math, Science, and Technology Education
2003 - 2008	ORT College Kfar Saba	Lecturer	Linear Algebra
2003 - 2004	Tel Aviv University	Lecture	Research Methodology A & B
2003 - 2004	Tel Aviv University	Instructor	SPSS for MA Students
2003 - 2005	Tel Aviv University	Teaching Assistant	Curriculum Development
2002 - 2005	Tel Aviv University	Teaching Assistant	Mathematics
2001 - 2002	Tichon (High School) Hadash Yitzhak Rabin Tel Aviv	Teacher	Mathematics
2000 - 2001	Tchernichovsky High School Netanya	Teacher	Mathematics
1999 - 2001	Ulpan Akiva Netanya	Teacher	Hebrew (Youth)
1992 - 1998	High School in Russia	Teacher	Mathematics
1991 - 1998	The Israeli Embassy Jewish School in Russia	Teacher	Hebrew

5. Academic Ranks and Tenure in Institutes of Higher Education

Dates	Name of Institution and Department	Rank/Position
2020 - present	Kibbutzim College	Lecture
2016	Levinsky College of Education	Lecture
2010 - present	Shenkar College of Engineering and Design	Lecture
2005 - 2012	Tel Aviv University	Lecture
2003 - 2008	ORT College Kfar Saba	Lecture

6. Participation in Scholarly Conferences

Active Participation

Dates	Name of Conference	Place of Conference	Subject of Lecture/Discussion	Role
2021	The 14th International Congress on Mathematical Education (ICME 14).	Shanghai, China	Constructing knowledge using digital tools: The case of the inflection point.	Lecturer
			Didactic consideration regarding the iterative development design of dynamic tools.	Co-author
2019	Calculus in upper secondary and beginning university mathematics	Kristiansand, Norway	Construction (and re-construction) and consolidation of knowledge about the inflection point: Gal and Shani confront errors using digital tools (pp.123-126)	Lecturer
2019	The association for Teacher Education in Europe (ATEE) Winter *2019* Conference: Science and Mathematics Education in the 21st century.	Portugal, Braga	Learning calculus concepts using the digital interactive environment: the case of studying the inflection point.	Lecturer
2018	The 7th Central and Eastern European Conference on Computer Algebra and Dynamic Geometry Systems in Mathematics Education.	Coimbra, Portugal	Didactic consideration with respect to applets for the teaching of mathematics	Lecturer

Dates	Name of Conference	Place of Conference	Subject of Lecture/Discussion	Role
2018	The 24th Conference on Applications of Computer Algebra	Santiago de Compostela, Spain	Consolidation of abstract knowledge in the process of confronting errors using digital tools: The case of the inflection point	Writer
2018	Mathematics Teachers Conference	Shefayim, Israel	Complex numbers in various representations: case of changing grids.	Lecturer
			Scaffolding tasks - an innovative approach to teaching high level of mathematics in a heterogeneous classroom.	Lecturer
2017	The 23rd Conference on Applications of Computer Algebra.	Jerusalem, Israel	The use of digital tools to confront errors	Lecturer
2017	Mathematics Teachers Conference	Ashkelon, Israel	The Use of Digital Tools to Confront Errors: The Case of Inflection Point	Lecturer
2017	5th Jerusalem Conference of Research in Math Education (JCRME5)	Jerusalem, Israel	Different Inflection Points in Different Representations For The Same Function	Lecturer
2017	The 5th Jerusalem Conference of Research in Math Education (JCRME5)	Jerusalem, Israel	The Process of Definition Construction in the Digital Environment: The Case of the Kite	Lecturer
2017	The 10th Congress of European Research in Mathematics Education (CERME 10)	Dublin, Ireland	To be or not to be an inflection point	Lecturer
			Geometric constructions in a dynamic environment (GeoGebra): the case of the in-service teacher.	Writer
2016	The 6th Central and Eastern European Conference on Computer Algebra and Dynamic Geometry Systems in Mathematics Education	Targu Mures, Romania	The impact of digital tools on students' learning of geometry.	Lecturer

Dates	Name of Conference	Place of Conference	Subject of Lecture/Discussion	Role
2006	The 13th Annual Conference of High School Mathematics Teachers in Israel	Tel Aviv, Israel	Does Intuition Help in Learning Probability?	Lecturer
			The Role of Online Tasks in Defining the Concept of Tangent	Lecturer
2006	The 30th Conference of the International Group for the Psychology of Mathematical Education (PME)	Prague, Chez Republic	Images of functions defined in pieces: The case of "non-inflection"-inflection point.	Lecturer
2005	12th Annual Conference of High School Mathematics Teachers in Israel	Tel Aviv, Israel	Can a Tangent Line Intersect the Graph of the Function?	Lecturer
2005	The 29th Conference of the International Group for the Psychology of Mathematical Education (PME)	Melbourne, Australia	"Erroneous tasks": prospective teachers' solutions and didactical views.	Lecturer
2004	Ayala Conference	Be'er Sheva, Israel	What is the Concept Image of the Inflection Point Among Student Teachers	Lecturer
2004	The 28th Conference of the International Group for the Psychology of Mathematical Education (PME)	Bergen, Norway	Prospective teachers' images and definitions: The case of inflection points	Lecturer

7. Colloquium Talks

Date	Place of Lecture	Name of Forum	Presentation/Comments
2005	University of Crete, Greece	4th Colloquium on the Didactics of Mathematics	Presentation: The causes of failure when handling the notion of inflection point
2022	Online meeting	Calculus 1+2ε meeting. Follow-up of the Kristiansand conference on in upper secondary and beginning university mathematics (2019)	Presentation: An explorative digital tool as a pathway to meaning: the case of the inflection point

8. Teaching

Courses Taught in Recent Years

Year	Name of Course	Type of Course
2020 – present	Analytic geometry	Lecture
2020 – present	Euclid geometry	Lecture
2021– present	Technological aspects in math education	Lecture
2021– present	Integrating technology in Learning Calculus	Lecture
2020– present	Algebraic thinking and the generalization of patterns	Lecture
2020– present	Advanced topics in Calculus	Lecture
2010 - present	Differential and Integral Calculus (A & B)	Lecture
2016	Vectors	Lecture
2016	Advanced topics in non-Euclidean Geometry	Lecture
2003 - 2008	Linear Algebra	Lecture

9. List of Publications

Ph.D. Dissertation

Students' Images and Definitions of Extrema and Inflection Points (200 pages, In Hebrew). Tel-Aviv University, 2016. Supervisor: Pessia Tsamir

Articles Published in Peer-Reviewed Journals

Tsamir, P., & Ovodenko, R. (2013). University students' grasp of inflection points. *Educational Studies in Mathematics*, 83 (3), 409-427.

Ovodenko, R., Kouropatov, A. (2018). The use of digital tools to confront errors during Advanced Calculus learning: The case of the inflection point. *Mathematics in Computer Science.* *https://rdcu.be/2L7q* .

Leikin, R., Ovodenko, R. (2021). Stepped tasks for teaching high-level mathematics in school: Top-Down structure of mathematical tasks. *For the learning of mathematics,* 41 (3), 30-35.

Anatoli Kouropatov, Regina Ovodenko, An explorative digital tool as a pathway to meaning: the case of the inflection point, Teaching Mathematics and its Applications: An International Journal of the IMA, Volume 41, Issue 2, June 2022, Pages 142–166, https://doi.org/10.1093/teamat/hrac007

In Hebrew

אובודנקו, ר., צמיר, פ. (2010). נקודת פיתול - דימויים שונים של המושג. *עלון למורה המתמטיקה*,42, 18-6.

Chapters in books

Leikin, R., Klein, S., Ovodenko, R. (2022). MATH-KEY Program: Opening mathematical minds by means of open tasks supported by dynamic applets. In Leikin R. (Ed.) *Mathematical challenges for all.* Springer

Submitted in Peer-Reviewed Journals

Tsamir, P., Ovodenko, R., Tirosh, D. (submitted). Extrema points: Definitions, concept images, and examples. *Educational Studies in Mathematics*.

In preparation

Ovodenko, R. & Leikin, R. (in preparation). Implementation of Stepped tasks in high-level mathematics classes: Focusing the teachers.

Ovodenko, R., Vishniker V. & Leikin, R. (in preparation). Collaboration and self-regulations linked to solving stepped tasks by high school students.

Articles in Published Peer-Reviewed Conferences (with at least 2 international reviewers)

Tsamir. P., & Ovodenko, R. (2004). Prospective teachers' images and definitions: The case of inflection points. In M.J. Hoines & A.B. Fuglestad (Eds.), *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematical Education* (Vol. 4, pp. 337-344). Bergen, Norway: PME.

Tsamir, P., & Ovodenko, R. (2005). "Erroneous tasks": prospective teachers' solutions and didactical views. In Chick, H. L. & Vincent, J. L. (Eds.), *Proceedings of the 29th Conference of the International Group for the Psychology of Mathematical Education* (Vol. 1, p. 283). Melbourne: PME.

Ovodenko, R., & Tsamir, P. (2006). Images of functions defined in pieces: The case of "non-inflection"- inflection point. In Novotná, J., Moraová, H., Krátká, M. & Stehlíková, N. (Eds.), *Proceedings of the 30th Conference of the International Group for the Psychology of Mathematical Education* (Vol. 1, p. 310). Prague: PME.

Kouropatov, A., Ovodenko, R. & Hershkovitz, S. (2016). The impact of digital tools on students' learning of geometry. *The 6th Central and Eastern European Conference on Computer Algebra and Dynamic Geometry Systems in Mathematics Education*. Targu Mures, Romania: CADGME.

Ovodenko, R., & Tsamir, P. (2017). To be or not to be an inflection point. *The 10th Congress of European Research in Mathematics Education*. Dublin, Ireland: CERME 10, p. 2209-2216.

Cohen, D., Kouropatov, A., Ovodenko, R., Hoch, M., & Hershkovitz, S. (2017). Geometric constructions in a dynamic environment (GeoGebra): the case of the in-service teacher. *The 10th Congress of European Research in Mathematics Education.* Dublin, Ireland: CERME 10, p.580-587.

Ovodenko, R. & Kouropatov, A. (2017). The use of digital tools to confront errors. *The 23rd Conference on Applications of Computer Algebra*. Jerusalem, Israel: ACA 23.

Fraenkel, M., Kouropatov, A., Ovodenko, R. (2018). Didactic consideration with respect to applets for the teaching of mathematics. *The 7th Central and Eastern European Conference on Computer Algebra and Dynamic Geometry Systems in Mathematics Education. University of Coimbra, Portugal*: CADGME.

Ovodenko, R., Kouropatov, A. (2018). Consolidation of abstract knowledge in the process of confronting errors using digital tools: The case of the inflection point. *The 24th Conference on Applications of Computer Algebra*. Santiago de Compostela, Spain: ACA 24.

Kouropatov, A., Ovodenko, R. (2019). Learning calculus concepts using the digital interactive environment: the case of studying the inflection point. *Proceedings of Association for Teacher Education in Europe (ATEE) Winter* 2019 *Conference: Science and Mathematics Education in the 21st century*. Portugal, Braga: University of Minho. *http://net.ie.uminho.pt/ateewinter2019/Abstracts.html*

Kouropatov, A., Ovodenko, R. (2019). Construction (and re-construction) and consolidation of knowledge about the inflection point: Gal and Shani confront errors using digital tools. In: *Calculus in upper secondary and beginning university mathematics – Conference proceedings*. Kristiansand, Norway: MatRIC / [ed] J. Monaghan, E. Nardi and T. Dreyfus, 2019, p. 123-127.

Ovodenko, R., Kouropatov, A. (2021). Constructing knowledge using digital tools: The case of the inflection point. Paper accepted for long presentation at the 14th International Congress on Mathematical Education (ICME 14). Shanghai, China.

Kouropatov, A., Ovodenko, R., Fraenkel, M., Hoch, M. (2021). Didactic consideration regarding the iterative development design of dynamic tools. Paper accepted for long presentation at the 14th International Congress on Mathematical Education (ICME 14). Shanghai, China.

Books

Geometry for Elementary School Grade 6. CET. 2020. (Content development team member).

Geometry for Middle School Grade 7-8 (completion-book towards Grade 9). CET. 2020. (Content development team member).

Mathematics for Middle School Grade 9. CET. 2020. (Content development team member).

Digital Textbook: Mathematics for Middle School Grade 9. CET. 2015. (Content development team member).

Mathematics for Middle School Grade 8. CET. 2014. (Content development team member).

Mathematics for Middle School Grade 7. CET. 2013. (Content development team member).

Mathematics for Middle School Grade 9. CET. 2012. (Content development team member).

10. Organization of Conferences or Sessions

Ovodenko, R., Kouropatov, A. (2018). Didactic considerations with respect to digital tools for the teaching of mathematics. *Working Group at the 7th Central and Eastern European Conference on Computer Algebra and Dynamic Geometry Systems in Mathematics Education*. University of Coimbra, Portugal: CADGME (Co-organizer).

Member – Program committee of the 10th annual meeting of the Jerusalem Conference on Research in Mathematics Education (JCRME10).

Member – Program committee of the 11th annual meeting of the Jerusalem Conference on Research in Mathematics Education (JCRME11).

11. Summary of my Academic Activities and Future Plans

My professional activities in math education have involved dealing with all main aspects of the field - teaching, development, and research. I have worked on STEM education frameworks as a teacher and as a developer of teaching materials for secondary and high school. I have taken my interest further in my doctoral studies, which focus on comprehension of Calculus concepts.

My past research projects include topics such as perception of mathematical concepts and identifying and correcting misconceptions in mathematics (calculus and geometry).

In addition to publishing articles and conference presentations related to my doctoral research, my main goal in the current years is ongoing research topics related to:

(1) **Developing an innovative approach to teaching math at a high level in heterogeneous classes.** The project has two main goals: first - the development of learning materials to support mathematics teachers in 5 units and help them deal with the heterogeneity of their class. The second - is to contribute to the development of skills-based learning and self-regulation; learning that leads to the development of knowledge, understanding, and skills in mathematics; and to develop strategic thinking among students in 5 unit classes. The study aims to validate and improve the adequacy and effectiveness of teaching and learning materials developed as part of the "Steps to 5" project. From the theoretical perspective, the development principles will be checked and validated. From the methodological perspective, rich research tools combine quantitative and qualitative tools that will be built systematically during the research that could be a model for the validity and suitability of teaching materials that deal with the mathematical step assignment. From the practical perspective, the research findings could be used for teachers and educational program creators in the planning and teaching mathematical subjects combined with the step assignment. The research findings could enable teachers' professionalism development (during implementation) in heterogeneous class management. The teacher trainers will be able to analyze the structure of the step assignments with the learners to emphasize the advantages of using a rich collection of step assignments in learners' knowledge construction and teaching.

(2) Construction processes of mathematical definitions in a digital environment, students' perceptions of mathematical concepts (in calculus and geometry), typical errors, and task design. Two theoretical perspectives are interwoven to inform design: technological and cognitive. The analysis is conducted using "Abstraction in Context" (AiC) as developed by Hershkowitz, Schwarz, and Dreyfus (2001) as a theoretical framework and, in particular, as a methodological tool using the RBC (recognizing-building with-constructing) model.