Editorial

The Journal of the International GeoGebra Institute of São Paulo (IGISP), ISSN 2237-9657, of biannual regularity, is an electronic publication of the GeoGebra Institute of São Paulo based at the Faculty of Exact Sciences and Technology, Program in the Post-Graduate Studies in Mathematics Education of the Pontifical Catholic University of São Paulo (PUC-SP), Brazil. In the areas of evaluation Teaching and Education, the journal obtained **A2** in the Classification of Periodicals Quadrennium 2017-2020 of Capes.

Free of charge, it aims to offer a space for the dissemination and circulation of researches and works developed with the use of the software GeoGebra, mainly in Latin America.

This first issue of volume 12 of the 2023 journal presents seven articles, an experience report and, in a proposal for action that seek to cover the different possibilities and paths with which GeoGebra can be investigated.

In the first article *"The GeoGebra software in the introductory teaching of Dynamic Systems: research with students of Bachelor's Degree in Mathematics"* the authors Eder Marinho Martins, Frederico da Silva Reis and Geraldo César Gonçalves Ferreira present an investigation on the contributions of a didactic sequence related to the dynamics of Planar Systems of Differential Equations, using the GeoGebra software, for the learning of Introduction to Dynamical Systems.

The second article *"GeoGebra as a facilitating tool in solving problems involving quadratic function"* the authors Claudino Luís Tavares Monteiro and Adelino Gomes da Silva explore the pedagogical potential of GeoGebra in the teaching and learning of the quadratic function, socializing the results of the implementation of the "Project Reinforcement of the training of mathematics teachers in Portuguese-speaking countries".

"The study of analytical geometry using GeoGebra software is the third article and the authors Ivan de Oliveira Holanda Filho and Marcos Paulo Mesquita da Cruz investigated the relationship between Philosophy, Science and Religion from a historical context in which the emergence of Analytical Geometry is situated and covering some BNCC topics and some classroom practices with GeoGebra.

The research in the fourth article, *"A dynamic view of the Pythagorean theorem with GeoGebra"* of the authors Victoria Mazotti Rodrigues da Silva, Rudimar Luiz Nós and Mari Sano present some dynamic views of the Pythagorean theorem using GeoGebra selected some demonstrations among the 370 cataloged by Elisha Scott Loomis in his work The Pythagorean Proposition.

Humberto José Bortolossi and Wanderley Moura Rezende are the authors of the fifth article *"A set of GeoGebra Applets for Teaching Fractions in Elementary school I"* present a set of applets designed to support the Book of Fractions for Elementary

School. produced by the Open Book project (https://bit.ly/3HLGi6V). They seek to highlight how these digital resources, built with GeoGebra, complement and enhance the different pedagogical strategies traditionally suggested for the teaching of fractions.

In the sixth article *"The Game "Múltiplos e Divisores": a hybrid approach to find the maximum path"* the authors Alexandre de Mattos Teixeira, Daniele Simas Pereira Alves, João Domingos Gomes da Silva Junior and Liliana Manuela Gaspar Cerveira da Costa argue that the game developed by Ceferino and available in the GeoGebra.org repository presents some inconsistencies and the corrections of the programming inconsistencies presents in the applet led to the construction of a new one, more elaborate than the original proposal.

In the seven article *"Dynamic imagery content on light polarization: exploring the potential of GeoGebra for the Teaching of Physics at the Higher Level"* the authors Davy Dias Andrade, José Carlos Oliveira de Jesus and Álvaro Santos Alves make available four simulations of our own, developed in GeoGebra Free Software, referring to the polarization of the monochromatic electromagnetic wave of flat wave front and the polarization methods via selective absorption, reflection and birefringence.

Finally, in the experience report *"Students leading their learning using the GeoGebra application for the study of Analytical Geometry"* the author Josenildo da Cunha Lima present the results of a project developed with students from a state school in Paraíba during two months in 2021, in which, in addition to remote classes for training the concepts of Analytical Geometry, Transformations and Cartographic Projections, activities were proposed with the use of smartphones, using the GeoGebra application to solve some proposed exercises.

The section "Proposals for the Action" present *"Solving a Brazilian Olympic problem in 3D for Augmented Reality in GeoGebra"* and the authors Paulo Vitor da Silva Santiago and Francisco Régis Vieira Alves present the construction of an Olympic problem using the GeoGebra Calculator application with the content of the circumscribed circumference in the equilateral triangle that works the plane geometry.

The second action proposal, by the authors Natalia Saborido López, Juan Gabriel Molina Zavaleta and Alejandro Miguel Rosas Mendoza, is entitled *Exploring the graphical representation of the third-degree polynomial function"* with the objective that students of the second year of high school explore the behavior of the graph corresponding to the polynomial function of the third degree.

The papers presented show the possibility of interdisciplinarity and trans disciplinarity in the context of Mathematics Education.

We express our thanks to all who contributed to the realization of this volume of the journal and to the academic production of Mathematics Education.

Celina A. A. P. Abar - Editor