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## 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 of Post-Graduate Studies in Mathematics Education of the Pontifical Catholic University of São Paulo (PUC-SP), Brazil, with Qualis CAPES A2.

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 third issue of volume 13 of the 2024 journal presents seven articles, two proposals for action and an experience report that seek to encompass the different possibilities and paths with which GeoGebra can be investigated.

In the first article "*Use of GeoGebra to facilitate the comprehension of the definitions of amplitude, period and phase diagram of the graphs of the trigonometric functions sine and cosine*" the authors Armando José García-Ortiz, Rainier Vicente Sánchez Camacho and Miguel Israel Bennasar-Garcia aim to improve the understanding of the definitions of amplitude, period and phase diagram of the trigonometric functions of sine and cosine, using GeoGebra software.

In the second article "*The Rubik's Cube and GeoGebra: a visual exploration of permutation groups*" the authors Renata Teófilo de Sousa, Francisco Régis Vieira Alves and Ana Paula Florêncio Aires aim to use the construction of the Rubik's Cube in GeoGebra as a primary tool for visualization and manipulation in the teaching of permutation groups in Abstract Algebra.

"*History of Mathematics and Technology: visualization of recurrent sequences, some properties and the notion of 2D/3D Board*" is the third article, and the author Francisco Régis Vieira Alves aims to present geometric properties related to the notion of Board that has an intimate relationship with the notion of numerical sequence.

In the fourth article "*Geometric visualization in trash bins*" the author aims to analyse images of trash bins seen and photographed in an environment of a city in which he found representations of entities involving geometric shapes that can be explored for the teaching and learning of Geometry.

Gabriel Cordelina and Elisangela Pavanelo, the authors of the fifth article "*A possibility of programming in GeoGebra: first steps*" aim to present GeoGebra LOGO as a possibility to work programming in the GeoGebra environment, presenting an introduction to how this approach works.

In the sixth article "*Exercise of pedagogical imagination on the use of virtual learning objects for the teaching of trigonometry*" the authors Janaina Estela Pinheiro, Vitor José Petry and Rosane Rossato Binotto aim to identify possibilities and potentialities of the use of virtual learning objects (OVA), aiming at the study of trigonometry and trigonometric functions.

*"Spherical Geometry and GeoGebra: trigonometric approach to solve navigation problems on the globe"* is the seventh article by authors Maurício Atlez Santos and Claudia Candida Pansonato and present results on spherical trigonometry and using them to solve navigation problems involving distances between points on the globe.

In the first work of the section "Proposals for Action", *"Visualization of elements of the Ascoli-Arzelà Theorem with GeoGebra software tools"* the authors André Luiz Araújo da Costa and Francisco Régis Vieira Alves aim to explore the use of GeoGebra software tools in the visualization of the concepts of continuity and convergence present in the statement of the Ascoli-Arzelà Theorem.

Silvio Luiz Gomes de Amorim, Frederico da Silva Reis and Neuber Silva Ferreira are the authors of the second work *"Building a pyramid using GeoGebra 3D and Augmented Reality on the smartphone: a proposal for pedagogical mediation for Spatial Geometry in High School"* which aims to present the construction of a pyramid using the technological tools GeoGebra 3D and Augmented Reality.

The work of the section "Experience Report", *"GeoGebra, a facilitator for the teaching of functions"* by the authors Jaqueline Maria da Silva, Jaime Batista de Souza and Arildo Castelluber presents a report of experiences that occurred during the implementation of a didactic sequence aimed at reviewing the content of functions using digital technologies as a didactic tool in person and online.

The works presented here highlight the possibility of interdisciplinarity and transdisciplinarity in the context of Mathematics Education.

We express our gratitude to all who contributed to the realization of this volume of the issue and to the academic research of Mathematics Education.

Celina A. A. P. Abar - Editor