

## **THE INFINITESIMAL CALCULUS IN TEXTBOOKS PUBLISHED IN SPAIN BEFORE ITS INCORPORATION INTO THE CURRICULUM OF SECONDARY EDUCATION**

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The research in the field of learning and teaching Calculus focuses on trends such as cognitive development or task design with particular attention to the concepts of limits, derivatives, and integrals (Bressoud et al., 2016). Studies on Calculus concepts approached through the History of Mathematics Education can help to face this problem since conceptual difficulties with teaching mathematics often correspond with historical periods of conceptual crisis in mathematics (Heeffer, 2006).

This research project aims to analyze the evolution of the contents of calculus and its teaching through teaching textbooks. The period selected is between the introduction of this branch of mathematics in Spain as a scientific discipline, that is, at the beginning of the 18th century, until the implementation of the first study plan that included it among its teachings, the Plan Pidal of 1845.

It is an exploratory, descriptive, and qualitative historical investigation focused on analyzing old textbooks from the perspective of the History of Mathematics Education. It is approached through the historical research method proposed by Ruíz (1976) and the content analysis technique proposed by Maz (2005).

The results of this project may be of interest to improving the training of mathematics teachers. They allow us to identify how, when, and why the difficulties students typically encounter when dealing with calculus-related topics in the classroom arose. It will also allow us to learn about the scientific approaches and teaching strategies used in the past to address these difficulties.

The selected study period coincides with the influence of recognized religious and military and, later, civil institutions dedicated to training engineers and professionals in developing and disseminating calculus from the mid-18th century to the beginning of the 19th century. This period also saw the consolidation of calculus in the rest of Europe. Finally, the calculus textbooks pub-

lished in Spain during this period contain misconceptions, such as the non-consideration of negative algebraic solutions. Therefore, it is relevant to know how and when the advances achieved in Europe were introduced in the teaching of calculus in Spain and whether the same misconceptions continue to be made over the selected period.

## REFERENCES

- Bressoud, D., Ghedamsi, I., Martinez-Luaces, V. & Törner, G. (2016). *Teaching and Learning of Calculus*. Springer Open.
- Heeffer, A. (2006). The Methodological Relevance of the History of Mathematics for Mathematics Education. In G. Dhompongsa, F. M. Bhatti & Q. C. Kitson (eds.), *Proceedings of the International Conference on 21st Century Information Technology in Mathematics Education* (pp. 267-276). Chang Mai, Thailand.
- Maz, A. (2005). *Los números negativos en España en los siglos XVIII y XIX*, (Doctoral PhD). Universidad de Granada.
- Ruiz, J. (1976) El método histórico en la investigación histórica de la educación. *Revista Española de Pedagogía*, 134, 449-475.