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The Jordan's group isomorphism concept in the work "Traité des substitutions et des équations algébriques"

Abstract

Research in mathematics education has evidenced difficulties faced by undergraduate students in understanding the concept of group isomorphism (Leron, Hazzan, & Zazkis, 1995; Lajoie, 2000). We have carried out a historical and epistemological study of this concept, with the goal of rescuing episodes or enabling elements that can help students to acquire this mathematical object (Anacona, 2003). To do this, we have revised different secondary sources such as Wussing (1984) and Kleiner (2007) that allowed us to determine the primary sources (Jordan, 1870; Dyck, 1882; Klein, 1884; Weber, 1893) that show the complex processes of genesis and evolution of group isomorphism during the nineteenth century.

We have used the historical methodology with phases as: heuristics, criticism, interpretation of sources, synthesis and exposition (Garraghan, 1946). For the sources analysis the qualitative text analysis method (Kuckartz, 2014) has been used.

We have considered three levels of study, each one deepening the information obtained in the previous one: a card of reference of the work; the context and purpose of the work and the author; and the presentation and treatment of the group isomorphism concept. The construction of categories has been done in a deductive-inductive way (Kuckartz, 2014), resulting the following categories for the second level: contextualization of the nineteenth century mathematics, contextualization of the work, characterization of the structure of the work and professional information of the author; and, finally for the third level, from a historical perspective: definition of the concept, other concepts involved, types of examples, and applications of the concept.

Specifically, this communication presents the results of the analysis of those sections of Camille Jordan's work (published in 1870) "Traité des substitutions et des equations algébriques", that concern the concept of group isomorphism. We have selected this book because here is where this concept appears explicitly for the first time.

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