Section 02: Algebra. Number Theory | Poster number 636

**Looking into Mengoli's triangle: arithmetic, algebra and geometry**

Maria Rosa Massa Esteve, CEHIC/Universitat Autònoma de Barcelona - I.E.S. Carles Riba.

**ABSTRACT**

This investigation deals with the mathematics work of Pietro Mengoli (1625-1686), Cavalieri's student. The seventeenth century mathematics developed from the interaction of three basic powers: 1) the classic legate of mathematics, illustrated by the works of Euclid and Arquimedes; 2) the appearance of algebra and its application to geometry and 3) the "infinitist" revolution, that is the extension of mathematics to the use of infinite algorithms. My research shows the interaction in Mengoli's thought of these development factors giving some analysis in context that clarify not only the inner dynamic of the theories proposed by Mengoli but also the system of thought that gives origine to these theories. This reconstruction gives us an inner consistence of Mengoli's work which was then known as divided and incomplete.

In spite of the fact that Mengoli goes through different mathematics fields his results, even in different works, remain all joined to the global idea of calculating quadratures and, particularly the quadrature of the cercle. The results that were not shown in the previous investigations are the following: the building of summations, the triangular tables of summations, the demonstration and obtention of the rule for finding the value of the sum of the powers, the idea of variable fully explained by Mengoli, the calculation of quasi proportions, the calculation with the infinity, the construction of the tables of quadratures, the new interpretation of the demonstration of the quadratures, the quadratures of expressions with the rational index, the calculation of the aproximations of infinite products and the computation of the number pi.

**Keywords:** *Mengoli, seventeenth century, algebra, arithmetical triangle*

**Mathematics Subject Classification:** *01-14*

**Contact Address:** mmassa@pie.xtec.es