

1067-01-623

Lawrence A. D'Antonio* (ldant@ramapo.edu), 24 Meadoway, Dobbs Ferry, NY 10522. *Gauss on the Composition of Quadratic Forms: Group Theory without Groups*. Preliminary report.

The theory of quadratic forms as presented by Gauss in his *Disquisitiones Arithmeticae* is a stunning achievement. One marvels at the depth and breadth of the invention of Gauss. In this talk we will focus on one aspect of that work, his definition of the composition of quadratic forms. This is not the familiar composition of functions; rather it is an abstract binary operation that is specifically defined for quadratic forms. Gauss shows that this operation obeys the associative law (without explicitly using that name). So has Gauss defined a group operation for quadratic forms? No, for as Gauss himself states, the composition is only defined under certain conditions. But has Gauss taken the first steps towards abstraction in algebra? We will look at this question in the context of the work of his predecessors, Euler and Lagrange. (Received September 11, 2010)