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Demonstration and Analysis in Euler's Mathematics

In a treatise on mechanics of 1736 Leonhard Euler commented on what he saw as a limitation of the traditional demonstrative approach to mathematics:

" ... the reader, even though he is persuaded about the truth of the things that are demonstrated, nonetheless cannot understand them clearly and distinctly. So he is hardly able to solve with his own strengths the same problems, when they are changed just a little, if he does not inspect them with the help of analysis and if he does not develop the same propositions with the analytical method."

Nevertheless, Euler recognized the value of demonstrative proof, writing in 1750 in a memoir on the theory of equations, "There are general truths that our mind is ready to embrace as true as soon as we recognize their justice in particular cases ...[and] not only in a few or several cases, but also in an infinity of different cases. However, we can agree readily that all of these infinite proofs are not able to shield this proposition from all objections that an adversary may form, and that it absolutely necessary to have a rigorous demonstration to silence these objections."

The paper explores how the notions of analysis, truth and rigor were understood by Euler and how they played out in his philosophy of mathematics.