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Gauss's first argument for least squares.

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Gauss's *Theoria motus* of 1809 was the first treatise to discuss the method of least squares (itself introduced by Legendre in 1805) in probabilistic terms. He showed that the probabilistic error function for a single variable representing some observation is distributed normally and used this fact to establish the method of least squares.

Histories of statistics have criticized Gauss's 1809 derivation for being circular. To obtain the normal distribution he supposed that the value of the variable is the arithmetic average over the range of observations, an assumption that is a special case of the method of least squares. The article under review analyzes his logic and suggests that his account should be construed not as a demonstration or deduction, but rather as an attempt to confirm the axiomatic character of the method. The author quotes (p. 45) the following remark of Gauss's: "the principle [of least squares]... should be considered as an axiom having the same authority everywhere as that by which the arithmetic mean of several observed values of the same quantity is taken as the most probable value".

Gauss also identified certain weaknesses in the Boscovich-Laplace method of error analysis, thereby providing evidence of a negative sort for the method of least squares. In the final section of the article the author presents his own investigation of the Boscovich-Laplace method and offers it as a possible reconstruction of Gauss's original reasoning.

The relevant background to the article is supplied by Stephen M. Stigler's *The history of statistics. The measurement of uncertainty before 1900* [Harvard Univ. Press, Cambridge, MA, 1986; MR0852410]. The author states in the introduction (p. 42, note 4) that he will "draw heavily on this book throughout the paper". *Craig G. Fraser*