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Soviet-era science, translated into English

# LETTER TO THE EDITOR

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**Abstract**

**Full Text**

## LETTER TO THE EDITOR

In my note “Differential equations with pure mixed derivatives and principal term,” printed in your journal, vol. 108, No. 5, p. 780 (1956), there are essentially repeated, as I have only just discovered, results of L. Bianchi (existence and uniqueness of the solution of the problem with characteristic boundary data and of the Cauchy problem; the bilinear formula (5), (6); the definition of the Riemann function, called by Bianchi the fundamental multiplier or fundamental solution <sup>(1)</sup>, supplemented by O. Nicoletti (Riemann’ s formula for the Cauchy problem <sup>(2)</sup>).

What is new that can be found in my note consists in the following: the formulation of the initial data in the form of a chain of successive pure mixed derivatives of the desired function; the determinability of the remaining derivatives on the given surface through such a chain (Theorem 3); the detailing of Riemann’ s formula in the form of formulas (8), (9), (10), likewise using only pure mixed derivatives; finally (which, from the technical side of the matter, is of significance), the use of sets as indices.

To this it should be added that L. Bianchi gives a proof of the existence of a solution only for the problem with characteristic boundary data and only for the simplest equation  $\partial^n u / dt_1 \dots dt_n = 0$ , when such a proof is quite elementary, and I have been unable to find any subsequent publications by Bianchi and Nicoletti on this topic after 1895. The necessary proofs for both problems were given by me (which, of course, found only a faint reflection in the short note in DAN), and they proved to be very laborious.

Unfortunately, I can judge the contents of Lahy’ s note <sup>(3)</sup> only from the brief review by Dressel <sup>(4)</sup>, who reports that in this note “the applicability of Riemann’ s method” is again shown for the corresponding equation of the 3rd order, but that “the works of Bianchi and Nicoletti on this problem are not mentioned.”

*M. K. Fage*

### CITED LITERATURE

<sup>1</sup> L. Bianchi, *Atti d. Reale Acc. d. Lincei, Rendiconti, Cl. di sc. fis., mat. e nat.*, (5), IV, p. 8–18, 89–99, 133–142 (1895).

<sup>2</sup> O. Nicoletti, *ibid.*, p. 330–337.

<sup>3</sup> E. Lahye, *Acad. Roy. Belg., Bull. Cl. Sci.*, (5), 31, 479 (1946).

<sup>4</sup> F. G. Dressel, *Math. Rev.*, 9, No. 2, 95 (1948).

*Note: Figure translations are in progress. See original paper for figures.*

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