

Given the family of surfaces $f(x, y, z, v) = 0$, and the curves

$$f = 0, \quad \partial f / \partial v = 0$$

(characteristics); if the equations

$$f = 0, \quad \partial f / \partial v = 0, \quad \partial^2 f / \partial v^2 = 0$$

have a complete solution, corresponding geometrically to a curve, this curve is a contact curve of the series of characteristics, provided

$$\frac{\partial f}{\partial y} \cdot \frac{\partial^2 f}{\partial z \partial v} - \frac{\partial f}{\partial z} \frac{\partial^2 f}{\partial y \partial v}, \quad \text{etc.},$$

are not all zero. It is not necessarily an envelope or an edge of regression. Monge's "arête de rebroussement" is not entirely justified, as is seen in the example of the circles of curvature and spheres of curvature of a space curve.

8. Dr. Velten's paper will appear in full in the next number of the *Jahresbericht*.

9. Professor Voigt first pointed out a number of serious errors in the current mathematical theory of taxes and tariff, and mentioned the remedy found in his recent book: *Mathematische Theorie des Tarifwesens* (Jena, 1912), namely, by means of a rational construction of the tariff from a mathematical basis. Certain advantages to both the importer and to the government were explained which would ensue from this procedure.

VIRGIL SNYDER.

SHORTER NOTICES.

Differential and Integral Calculus. By Professor L. S. HULBERT. New York, Longmans, Green, and Co., 1912. xviii + 481 pp. with figures.

THE subtitle of this volume, "An introductory course for colleges and engineering schools," indicates the scope of the author's aims. In view of the numerous elementary text books on the calculus, each enjoying more or less popularity at the present time, it might seem a priori that a newcomer in the field would have difficulty in displaying sufficient individuality to warrant its entrance upon the stage. But no