The auxiliary function θ is the temperature and the obvious physical mode of solution is Liouville's method of successive substitutions.*

A case of special interest physically is that in which k is defined by

$$k\kappa = 1.$$

Is there any method of numerical computation better than approximate integration?

HAVERFORD COLLEGE,
March, 1910.

GRASSMANN'S PROJECTIVE GEOMETRY.

Projektive Geometrie der Ebene unter Benutzung der Punktrechnung dargestellt. Von HERMANN GRASSMANN. Erster Band: *Binäres.* B. G. Teubner, 1909. 8vo. xii + 360 pp.

MODERN projective geometry is two-sided. Either use is made of algebraic analysis in its development or it is developed from the fundamental concepts of point, line, plane by means of certain axioms and postulates. In the one case it is analytic, in the other synthetic. Usually the two methods of presentation are more or less combined, with the emphasis laid upon the one or the other. If the analytic method is adopted, operations are usually carried out in cartesian space with the aid of a system of coordinates. The synthetic method makes no use o coordinate systems.

Professor Grassmann's work is analytic in character in that use is made of algebraic analysis. It is unique in discarding the usual coordinate systems and adopting ideas due to Möbius and to the elder Grassmann. These ideas found expression in the Baryzentrische Calcul and in the Ausdehnungslehre.

In the last quarter century a number of writers have made use of these ideas; notably, Stéphanos, H. Wiener, Segre, Peano, Aschieri, Study, Burali-Forti. It is the author's purpose to bring the results of these writers and of others together into a connected course covering the fields of binary and ternary linear transformations. This is certainly a most worthy purpose and mathematicians will be grateful to the author for the evident care and devotion with which he has set about the performance of his task.

* Maxime Bôcher, An introduction to the study of integral equations. Cambridge, Eng., 1909.