NOTE ON THE PROJECTIONS OF THE ABSOLUTE ACCELERATION IN RELATIVE MOTION.

BY DR. G. O. JAMES.

INASMUCH as the usual methods of forming the projections of the absolute acceleration on the moving axes rest to a certain extent on geometric considerations it has seemed worth while to treat the question from a purely analytic point of view and derive these expressions by purely algebraic processes. This method possesses the advantage of being immediately extensible to any number of dimensions, and in the latter part of this note I shall give the expressions for n dimensions.

Connecting the moving axes Ox, Oy, Oz with the fixed axes by the following schema

$$\begin{array}{c|ccc} & x & y & z \\ \hline X & a & b & c \\ Y & a' & b' & c' \\ Z & a'' & b'' & c'', \end{array}$$

I shall rapidly recall the following equations :

$$(1) \qquad X = Sax, \quad Y = Sa'x, \quad Z = Sa''x,$$

where S denotes summation with respect to a, b, c and x, y, z.

$$(2) \qquad \begin{cases} \dfrac{dX}{dt} = Sa\dfrac{dx}{dt} + Sx\dfrac{da}{dt}, \\ \dfrac{dY}{dt} = Sa'\dfrac{dx}{dt} + Sx\dfrac{da'}{dt}, \\ \dfrac{dZ}{dt} = Sa''\dfrac{dx}{dt} + Sx\dfrac{da''}{dt}; \end{cases}$$