respectively, is equivalent to a transformation $T_c$ of the group, generated by the infinitesimal transformation

$$c_1 X_1 + \cdots + c_r X_r,$$

with finite parameters $c_1, \cdots, c_r$; that is to say, if a system of finite values of the $c$'s can be found to satisfy the symbolic equation $T_b\, T_a = T_c$. On page 282 we saw that the composition of the two arbitrary transformations $T_a$ and $T_b$ of the family defined by equations (4) was equivalent to a transformation $T_c$ of the family, with finite parameters $c$. But equations (4) were not in their canonical form, and therefore it did not necessarily follow that the transformation $T_c$ could be generated by an infinitesimal transformation of the group, as shown above. Consequently, if the finite equations of a group are not in their canonical form, the condition that for every finite system of values of the $a$'s and $b$'s a finite system of the $c$'s can be found to satisfy the symbolic equation $T_b\, T_a = T_c$ is a necessary but not a sufficient condition for the continuity of the group.

UNIVERSITY OF CINCINNATI,
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# SOME APPLICATIONS OF GREEN'S THEOREM IN ONE DIMENSION.

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GREEN'S theorem ordinarily has reference to Laplace's equation in either two or three dimensions. It has been generalized however in the case of two dimensions by replacing Laplace's equation by the general homogeneous linear differential equation of the second order. In the generalized form the theorem relates not only to the given differential equation, but also to its adjoint differential equation.* A further extension of the theorem is possible by considering a differential equation of the $n$th order in two or more independent variables, and its corresponding adjoint.†

* Cf. Encyklopädie, II, A. 7 c., p. 513.

† Cf. Darboux, Théorie des Surfaces, vol. 2, pp. 72, 74, for the case of two independent variables.