The main question is whether, if $f(x)$ has a derivative,

$$f'(x) = u_1'(x) + u_2'(x) + \cdots$$

is a true equation. The right-hand side can be written in the form

$$\lim_{n=\infty}\left[\frac{d}{dx}\int_0^n f(x,y)\,dy\right] = \lim_{n=\infty}\left[\int_0^n \frac{\partial f(x,y)}{\partial x}\,dy\right]$$
$$= \int_0^\infty \frac{\partial f(x,y)}{\partial x}\,dy,$$

and thus the question is reduced to that of whether

$$\frac{d}{dx}\int_0^\infty f(x,y)\,dy = \int_0^\infty \frac{\partial f(x,y)}{\partial x}\,dy$$

is a true equation.

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LINEAR DIFFERENTIAL EQUATIONS.

Einleitung in die Theorie der linearen Differentialgleichungen mit einer unabhängigen Variablen. Von DR. LOTHAR HEFFTER. Leipzig, Teubner, 1894. 8vo, XIV+258 pp.

IN teaching higher mathematics, the question presents itself, to what functions beyond the algebraic and elementary transcendental functions should the student be introduced first? The answer which is given to this question almost as a matter of course is: the elliptic and then the Abelian functions. Without in any way casting doubt upon the wisdom of the choice here expressed for many cases (perhaps even for most cases as far as the elliptic functions go), it may be pointed out that the above is by no means the only satisfactory answer, and that the explanation of its almost universal acceptance is to be found in great part in mere tradition. Another class of functions which forms from many points of view an equally satisfactory introduction to the study of the higher transcendental functions, is the class with which the book under review deals, *i. e.*, functions defined by homogeneous linear differential equations. Not only is this true of the study of these functions