## Note on the different proofs of Fourier's Series.

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## The Use of Green's Functions in the Mathematical Theory of the Conduction of Heat.

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§ 1.

The use of Green's Functions in the Theory of Potential is well known. The function is most conveniently defined, for the closed surface S, as the potential which vanishes over S and is infinite as $\frac{1}{r}$, when $r$ is zero, at the point $P(x_0, y_0, z_0)$, inside the surface. If this is represented by G(P), the solution with no infinity inside S and an arbitrary value V over the surface, is given by

$$v = \frac{1}{4\pi}\iint \frac{\partial}{\partial n} G(P) \, . \, V \, . \, dS,$$

$\frac{\partial}{\partial n}$, denoting differentiation along the outward drawn normal.

In the other Partial Differential Equations of Mathematical Physics similar functions may with advantage be employed, and,

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