



LXV. Supplemental note on a proposed method for the better practical application of Fourier's theorem

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The ratio of the energy transmitted per unit of time per degree of freedom to the energy stored in that freedom takes here the place of the element of energy, and there is no limitation upon its finitude. There is necessarily equipartition of energy amongst all freedoms for which that ratio has one and the same value.

LXV. *Supplemental Note on a Proposed Method for the better practical application of Fourier's Theorem.* By L. R. MANLOVE *.

THE method suggested by the writer in the Phil. Mag. for July last involves this assumption :—

“When, being uncertain whether there are any real roots of an equation between two given consecutive integers, we proceed as if approximating by Lagrange's method to the roots in that interval, then in case no such roots actually exist we shall ultimately obtain a derivative equation which can be seen to have unity for the superior limit of its positive roots.”

No formal proof is attempted, but the following considerations show that the assumption is well founded.

Ex hypothesi we have a series of derivative equations none of which has a positive root greater than unity, and for the present purpose we may treat these as independent equations.

Given that an equation has in fact no real root greater than unity, and that nothing further is known, what is the probability that it can be seen to have unity as a superior limit of the roots?

Suppose that this probability is p for each equation ; then the probability of the first equation failing is $1-p$; and the probability of the first n equations all failing is $(1-p)^n$ which may be made as small a quantity as we please by taking n large enough.

In testing the method with some scores of examples the writer has only in one case found it necessary to go so far as the 3rd derivative equation. Of forty equations taken at random only five required more than one derivative to clear up an interval.

* Communicated by the Author.