This theorem can also be immediately applied to Bessel's functions whose order is not zero. Let $F_n(x)$ be any real solution of Bessel's equation

$$(4) \qquad \frac{d^2y}{dx^2} + \frac{1}{x}\frac{dy}{dx} + \left(1 - \frac{n^2}{x^2}\right) y = 0.$$

Using polar coördinates r, ϑ we have as a solution of (3) when n is real

$$u = \cos n\vartheta \cdot F_n(r),$$

when n is pure imaginary

$$u = e^{in\vartheta} \cdot F_n(r).$$

Applying the theorem just quoted to these solutions we get the theorems:

If $n^2 \leqq 1$, $F_n(x)$ *vanishes at least once in any interval of length* $2c = 4.810 \cdots$ *which does not include the origin.*

If $n > 1$, $F_n(x)$ *vanishes at least once in any interval of length* $2c$ *throughout which* $|x| > c\left[\csc\frac{\pi}{2n} - 1\right]$.

As a special application I note that we thus get an upper limit for the value of the smallest root of $F_n(x)$ and thus in particular of $J_n(x)$.

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A GENERALIZATION OF APPELL'S FACTORIAL FUNCTIONS.

BY DR. E. J. WILCZYNSKI.

(Read before the American Mathematical Society at the Annual Meeting, December 28, 1898.)

LET
$$F(s, z) = 0$$

be an algebraic equation defining s as function of z. Let R, the corresponding Riemann's surface, be of class p. By a system of crosscuts $a_1, \cdots, a_p$; $b_1, \cdots, b_p$; $c_1, \cdots, c_p$ the $(2p + 1)$-ply connected surface R is changed into a simply connected surface R_{abc}.