REFERENCES

1. P. Erdös and M. Kac, *On certain limit theorems of the theory of probability*. Bull. Amer. Math. Soc. vol. 52 (1946) pp. 292–302.

2. A. Wald, *On cumulative sums of random variables*, Ann. Math. Statist. vol. 15 (1944).

3. ———, *Sequential tests of statistical hypotheses*, Ann. Math. Statist. vol. 16 (1945).

4. M. Kac, *Random walk in the presence of absorbing barriers*, Ann. Math. Statist. vol. 16 (1945).


COLUMBIA UNIVERSITY

# NOTE ON THE ZEROS OF $P_n^m(\cos\theta)$ AND $dP_n^m(\cos\theta)/d\theta$ CONSIDERED AS FUNCTIONS OF $n$

C. W. HORTON

In many physical problems in which the boundary conditions are specified over the surface of a cone, it is necessary to know the roots of the equations

$$P_n^m(\cos\theta) = 0 \tag{1}$$

and

$$dP_n^m(\cos\theta)/d\theta = 0 \tag{2}$$

considered as functions of $n$. This problem has been solved by Bholanath Pal.[1] In these papers he develops infinite series for the roots $n$ which converge rapidly and are very suitable for numerical computation. In deriving his solution Pal introduced a parameter $k$ which takes on successive integer values and thereby yields successive roots of the equations.

It is the purpose of this note to point out that the value $k=1$ with which Pal commenced the series does not always give the first root of the equation, and sometimes it gives a number which is not a root of the equation. For example, in treating the equation $P_n^2(\cos\theta)=0$, Pal gives three roots: $n=4.77$, 2.26, 1.52, corresponding to values of $\theta$ equal to 15°, 30°, 45°, respectively. That these values are not roots

Received by the editors August 19, 1946.

[1] Bull. Calcutta Math. Soc. vol. 9 (1917–1918) p. 85; vol. 10 (1918–1919) p. 187.