$$\pi^{-1}\int_{-\pi}^{\pi}|p_n'(e^{i\theta})|^2d\theta \leqq (2\pi)^{-1}\int_{-\pi}^{\pi}|q_n'(e^{i\theta})|^2d\theta + (2\pi)^{-1}\int_{-\pi}^{\pi}|p_n'(e^{i\theta})|^2d\theta$$

$$= \sum_{\nu=0}^{n}(\nu^2+(n-\nu)^2)\,|\alpha_\nu|^2.$$

The greatest of the numbers $\nu^2+(n-\nu)^2$, $\nu=1, \cdots, n$, is n^2. Therefore

$$\pi^{-1}\int_{-\pi}^{\pi}|p_n'(e^{i\theta})|^2d\theta \leqq n^2\sum_{\nu=0}^{n}|\alpha_\nu|^2, \tag{8}$$

which was the assertion.

For $p_n(z)=(z^n+1)/2$ the sign of equality holds in (8).

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A NEW FORMULA FOR INVERSE INTERPOLATION

HERBERT E. SALZER

This paper is devoted to the derivation of a formula for inverse interpolation in a table of equally spaced arguments. The resulting formula (5) is more concise and convenient than those in existence. It involves neither differences nor polynomial coefficients other than small powers. In use it will be found much simpler and quicker than those given by Davis, Aitken, Steffensen and Milne-Thomson. In a sense, it is the analogue of the Lagrangian formula for direct interpolation without differences (that is, in terms of the tabular entries only) if the usual expression (right member of (1) below) is rearranged in terms of powers of the argument p.

Lagrange's general interpolation formula is

$$f(x) = \sum_{\nu=0}^{\nu=k}\frac{P_\nu(x)}{P_\nu(a_\nu)}f(a_\nu), \quad \text{where} \quad P_\nu(x) = \frac{1}{(x-a_\nu)}\prod_{i=0}^{i=k}(x-a_i).$$

For equally spaced arguments at interval h, after suitable relabelling of the arguments a_i, Lagrange's formula becomes

$$f_p = \sum_{i=-[(n-1)/2]}^{i=[n/2]} L_i^{(n)}(p)f_i, \tag{1}$$

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