JOURNAL OF APPROXIMATION THEORY **25**, 91 (1979)

Erratum

Volume **18**, Number 1 (1976), in the article "Variations on a Theme by Schoenberg" by W. Weston Meyer and Donald H. Thomas, pp. 39–49:

Jeffrey M. Lane and Richard F. Riesenfeld have kindly pointed out to us that, contrary to our statement on top of page 41, the number of sign changes in the ordered set of coefficients

$$a_j = \sum_{i=1}^{m} f(x_{i+j})/m, \qquad j = 0, 1,..., n,$$

may well be greater than in the sequence $f(x_k)$, $k = 1,..., n + m$, for example, when $m = 3$ and $(f(x_k)) = (4, 6, 6, -13, 10, 2)$. Another counterexample, our own, is the following. Let $x_k = k$ and

$$f(x) = e^{-x} \cos x\pi + \cos \frac{2x-1}{m} \pi.$$

Then, for $m = 3$,

$$a_j = -\frac{e^{-1} - e^{-2} + e^{-3}}{3} e^{-j} \cos j\pi.$$

Moreover, the spline approximant which we denoted by $s_\Delta f$ takes on the nodal values

$$s_\Delta(f(x_k)) = -\frac{e - 4e^2 + e^3}{6} a_k$$

for all $k \geqslant 3$. Since the distance between consecutive zeros of f approaches $m/2$ as x becomes large, whereas $s_\Delta f$ alternates in sign from knot to knot, it is clear that the sign changes of $s_\Delta f$ are sure to outnumber those of f if enough knots be allowed. The same function f works against us when $m > 3$. Hence we must withdraw the claim that s_Δ is variation-diminishing generally (it remains so in the quadratic case, $m = 2$). The withdrawal does not affect any of the other claims made about s_Δ nor any of the results stated as theorems in the paper.

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