CORRECTION TO

"NOTES ON NUMERICAL ANALYSIS II"[1]

Hans Schwerdtfeger

On the occasion of a talk at the 4th Gatlinburg Symposium on Numerical Algebra (April 1969), Dr. J.D. Powell drew my attention to an error in the representation of the coefficients $c_3, c_4, \ldots$ by means of the divided differences as given on p. 43 (bottom lines) of my paper referred to in the title of this note. He pointed out that if $f(x)$ was a sectionally linear interpolation of a quadratic function, then the values $c_3, c_4, \ldots$ would all be zero which is impossible.

Although the values of the c_j are not actually used in the course of the paper, their correct values in terms of the divided differences may now be indicated for $j = 3, 4, 5$. They can be calculated successively from the formulae

$$f(x_0) = c_0, \; f(x_1) = c_0 + c_1(x_1 - x_0),$$

$$f(x_2) = c_0 + c_1(x_2 - x_0) + c_2(x_2 - x_1),$$

$$f(x_3) = c_0 + c_1(x_3 - x_0) + c_2(x_3 - x_1) + c_3(x_3 - x_2),$$

$$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$$

Thus

$$c_1 = f(x_0, x_1), \quad c_2 = f(x_0, x_1, x_2)(x_2 - x_0),$$

$$c_3 = \Big(f(x_0, x_1, x_2) + f(x_0, x_1, x_2, x_3)(x_3 - x_0)\Big)(x_3 - x_1),$$

$$c_4 = \Big(f(x_0, x_1, x_2) + f(x_0, x_1, x_2, x_3)(x_4 - x_1 + x_3 - x_0) + f(x_0, x_1, x_2, x_3, x_4)(x_4 - x_0)(x_4 - x_1)\Big)(x_4 - x_2),$$

$$c_5 = \Big(f(x_0, x_1, x_2) + f(x_0, x_1, x_2, x_3)(x_5 - x_2) + f(x_0, x_1, x_2, x_3, x_4)\big((x_5 - x_1)(x_5 - x_2) + (x_4 - x_0)(x_5 - x_2) + (x_4 - x_0)(x_4 - x_1)\big) + f(x_0, x_1, x_2, x_3, x_4, x_5)(x_5 - x_0)(x_5 - x_1)(x_5 - x_2)\Big)(x_5 - x_3).$$

REFERENCE

1. Hans Schwerdtfeger, Notes on numerical analysis II. Canad. Math Bull. 3 (1960) 41-57.

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https://doi.org/10.4153/CMB-1969-047-2 Published online by Cambridge University Press