

1086-VL-536

Jean-Paul Berrut* (jean-paul.berrut@unifr.ch), University of Fribourg, Department of Mathematics, Perolles, CH-1700 Fribourg, Switzerland. *Boole's summation formula and features of jump singularities*. Preliminary report.

The Euler-Maclaurin formula writes the sum $T(h)$ of equispaced values of a function on the circle as an integral plus the difference, consisting of the sum of a polynomial in the interval mesh h and another integral multiplied by a larger power of h . It was originally employed by Euler to approximate such sums of function values by integrals, before Romberg used it the other way around, namely to approximate integrals by extrapolating sums $T(h)$ for decreasing h .

As mentioned several times in recent years by J. Borwein and collaborators, a much less well known formula is that by Boole, which gives a corresponding expression for the *alternating* sum $A(h)$. Boole obtained it through the study of finite differences. In most appearances in print, only the idea of the proof is given; we first derive it here from the Euler-Maclaurin formula. Then, in the wake of Romberg, we use it to estimate one-sided limits of functions at jumps by extrapolating values $A(h)$ for decreasing h . (Received September 06, 2012)