

Darboux's Formula with Integral Remainder and Related Results

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ABSTRACT

In 1949, Hummel and Seebeck established as generalization of Taylor's expansion (polynomials) where they developed a power series expansion which accelerate a convergence twice as rapidly as the Taylor expansion. Historically, this result was established ten years before that by Breschkoff in 1940. Due to the Second World War it may happen to have such work intersection. In fact, works of Obreschkoff and Hummel–Seebeck were just a simple case of one more general formula which established by Darboux himself in 1876.

We would like to give various results related to Darboux's formula with integral reminder by introducing harmonic sequences of polynomials. In last three decades, the concept of harmonic sequences of polynomials, or Appell polynomials, has been extensively used in numerical integration and expansion theory of real functions. To be more specific, we would generalize many established results including Fink's identity and its sharp bounds, and Ostrowski's inequality. We will also obtain left and right bounds of Hermite-Hadamard type dual inequality.
