On Frobenius-Euler Polynomial of high-order convolution formula

Zhang hang

Shijiazhuang Railway University, Shijiazhuang, Hebei Province, 050000

Abstract: Study Frobenius-Euler Polynomial use generation function thought and combination are established. The polynomial of a High-Order convolution formula makes Dilcher the classic results was as an special obtained.

Keywords: Frobenius-Euler Polynomial; Euler Polynomial; Convolution formula

1. The introduction and main results

When study power and problem when Switzerland mathematician Jacob Bernoulli (1654-1705) and Leonhard Euler (1707-1783) were found there sequence Polynomial \( \{B_n(X)\}_{n=0}^{\infty} \) and \( \{E_n(X)\}_{n=0}^{\infty} \) can provide before \( n \) natural number \( k \) times power and before \( n \) natural number number of alternating \( k \) times power and of unified formula.\(^{[1-4]}\) These Polynomial \( B_n(X) \) and \( E_n(X) \) respectively was called Bernoulli polynomial and Euler polynomial. They usually by as follows generation function definition: Special Rational \( B_n = B_n(0) \) and integer \( E_n = 2^n E_n(1=2) \) Respectively was called Bernoulli number and Euler number. More Bernoulli number and Euler number of and its polynomial in mathematics of different field in play an important role. Which L; in; LD; NA non-negative integer Literature-based\(^{[5-7]}\) Okay. Bernoulli study on the sum formula of the product of numbers, in 1996 Year, Literature\(^{[8]}\) studied (3) type

Among them

\[ X_1 \cdots X_D \]

In view of the above literature research results, this paper will Frobenius-Euler Further research on Polynomial. By applying generative function thought and composition techniques, Establish Frobenius-Euler Polynomial of a High-Order convolution formula. As an application Dilcher of high-order convolution formula\(^{(5)}\) was as an special situation.

Which \( D \) is a positive integer \( M \); \( n \) a non-negative integer \( \text{And} \ Y = X_j \text{In} \cdot D; \text{Obvious}\(^{(8)}\) In \( M = 0 \) The situation that Dilcher Of Formula\(^{(5)}\). Similar Theorem 1.1 In \( M = 0 \) The situation given. Frobenius-Euler Polynomial Dilcher high-order convolution formula\(^{(5)}\) is \( n = -1 \) The again given Dilcher Of Formula\(^{(5)}\).

Which \( F(X) \) is said \( F(X) \) on \( X_0 \) N-Order Derivative and \( S(N; d) \) is the second class Stirling Number.

\[ \{F_n(X)\}_{n=0}^{\infty} \text{ is a polynomial sequence was to:} \]

[Signal]

\[ F_n(X) = \sum_{k=0}^{n} \binom{n}{k} X^k F(T)^k \]

\[ N! \]

\[ N = 0 \]

Here \( F(T) \) is a Power Series.

Syndrome Tomorrow See Literature\(^{(14)}\).
4. OfBeam Language

In fact With prove(7) Similar Method of formula, Can also build Bernoulli the following higher-order convolution formulas of Polynomials:

\[(X)\mathcal{D}_{\text{d}}(MN) \Sigma \sigma_{\text{d}} (\mathcal{D}_{\text{d}}(MN)) (X) (\mathcal{D}_{\text{d}}(MN)) (X) \]

Among them DI is a positive integer, M; n Non-negative integer satisfaction MN \( \geq d \), And \( Y = X_1, \cdots, X_d \). Apparently, (18) Type \( M = 0 \) The situation is Dilcher Formula (4). (18) Type in \( X_1, \cdots, X_d = X \) Given Bayad And Komatsu Formula (6) An equivalent form. Literature [16] Elliptic Polynomial existence and (8) Type and (18) What about the higher-order convolution formula? In the future, the author will Further study of the topic.

References