OnFrobenius-EulerPolynomial of high-order convolution formula

Zhang hang

Shijiazhuang Railway University, Shijiazhuang, Hebei Province, 050000

Abstract:StudyFrobenius-EulerPolynomialUse generation function thought and combination are established. The polynomial of a High-Order convolution formulaMakesDilcherThe classic results was as an special obtained.

Keywords:Frobenius-EulerPolynomial; EulerPolynomial;Convolution formula

1. The introduction and main results

When study power and problem when Switzerl and mathematicianJacob Bernoulli (1654-1705)AndLeonhard Euler (1707-1783)Were found there sequence Polynomial$\{B_N(X)\}^N_{N=0}$And$\{E_N(X)\}^N_{N=0}$Can provide beforeNA natural numberKTimes power and beforeNA natural number of alternatingKTimes power and of unified formula.[1-4]These Polynomial$B_N(X)$And$E_N(X)$Respectively was calledBernoulli

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 Bernoul li Number of and Euler Number. More Bernoul liNumber of and its polynomial and Euler Number of and its polynomial in mathematics of different field in play an important role WhichL_1; In in; L_D; NA non-negative integer Literature-based[5-7]Okay.BernouulliStudy on the sum formula of the product of numbers,In1996Year,Literature[8]Studied(3)Type

Among them

$=X_1 \cdots X_D$;

In view of the above literature research results,This paper willFrobenius-EulerFurther research on Polynomial.By applying generative function thought and composition techniques,EstablishFrobenius-EulerPolynomial of a High-Order convolution formula.As an applicationDilcherOf high-order convolution formula(5)Was as an special situation.

WhichDIs a positive integerM; nA non-negative integerAndY=X_1In in $\cdot X_D$.Obvious(8)-InM= 0The situation thatDilcherOf Formula(5).SimilarTheorem1.1InM= 0The situation given.Frobenius-EulerPolynomial

DilcherHigh-order convolution formulaIts in=-1The again givenDilcherOf Formula(5).

Which$F(X)^{(N)}$SaidF(X)OnXOfN-Order DerivativeAndS(N; d)Is the second classStirlingNumber.

$\{F_N(X)\}^N_{N=0}$Is a polynomial sequence was to:

$^{Sigma1}{}_{FN(X)}{}^{TN}{}_{=F(T)\ E}(X1=2)T_;$

N!

N= 0

HereF(T)Is a Power Series.

SyndromeTomorrow See Literature[14].)

4. OfBeam Language

In factWith prove(7)Similar Method of formula,Can also buildBernouulliThe following high-order convolution formulas of Polynomials:

$_{(-1)}D1._{D}{}^{(MN)\ \mathrm{SigmaD1.}}{}_{(-1)}J^{\{\Sigma J(DK-J-1)}{}_{S(D;\ dK-J)Y}K^{\}}*$

Among themDIs a positive integer,M; nNon-negative integer satisfactionMN≥d,AndY=$X_{1}\cdots X_{D}$.Apparently,(18)Type

M= 0The situation isDilcherFormula(4). (18)Type in$X_{1}=\cdots=X_{D}$=XGivenBayadAndKomatsuFormula(6)An equivalent form.Literature?[16]Elliptic Type considered inApodol-BernoulliDuo

Terms and ellipsesApodol-EulerPolynomial existence and(8)Type and(18)What about the higher-order convolution formula??In the future, the author will,Further study of the topic.

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