

1086-11-1010

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In this paper, we develop methods of expressing any polynomial with rational coefficients as a rational linear combination of higher-order Bernoulli polynomials and as that of higher-order Euler polynomials. As applications, we will derive some interesting arithmetic identities involving higher-order Bernoulli or higher-order Euler polynomials. Here first we consider the cases that the orders are equal and then we extend those to the cases that the orders are unequal. (Received September 17, 2012)