

# Duals of Bernoulli Numbers and Polynomials and Euler Numbers and Polynomials

Tian-Xiao He, Jinze Zheng\*

*Department of Mathematics, Illinois Wesleyan University, Bloomington, IL 61701*

*jzheng@iwu.edu*

A sequence inverse relationship can be defined by a pair of infinite inverse matrices. If those two matrices are the same, they define a dual relationship. We generate a unified approach to construct dual relationships using pseudo-Riordan involutions. Then we give four dual relationships for Bernoulli numbers and Euler numbers, from which the corresponding dual sequences of Bernoulli polynomials and Euler polynomials are constructed. Some applications in the construction of identities of Bernoulli numbers and polynomials and Euler numbers and polynomials are discussed based on the dual relationships.