

Extended Zeilberger's Algorithm for Identities on Bernoulli and Euler Polynomials

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Abstract: We present a computer algebra approach to proving identities on Bernoulli polynomials and Euler polynomials by using the extended Zeilberger's algorithm given by Chen, Hou and Mu. The key idea is to use the contour integral definitions of the Bernoulli and Euler numbers to establish recurrence relations on the integrands. Such recurrence relations have certain parameter free properties which lead to the required identities without computing the integrals. Furthermore two new identities on Bernoulli numbers are derived.

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Keywords: Bernoulli number, Euler number, Bernoulli polynomial, Euler polynomial, Zeilberger's algorithm

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