Zudilin, W.

An Apéry-like difference equation for Catalan's constant. (English) Zbl 1093.11075

Electron. J. Comb. 10, No. 1, Research paper R14, 10 p. (2003).

Summary: Applying Zeilberger's algorithm of creative telescoping to a family of certain very-well-poised hypergeometric series involving linear forms in Catalan's constant with rational coefficients, we obtain a second-order difference equation for these forms and their coefficients. As a consequence we derive a new way of fast calculation of Catalan's constant as well as a new continued-fraction expansion for it. Similar arguments are put forward to deduce a second-order difference equation and a new continued fraction for $\zeta(4) = \pi^4/90$.

MSC:

11Y60	Evaluation of number-theoretic constants
33C20	Generalized hypergeometric series, ${}_pF_q$
33F10	Symbolic computation of special functions (Gosper and Zeilberger algorithms, etc.)
39A05	General theory of difference equations

Full Text: arXiv EuDML EMIS