A further generalization of the Catalan numbers and its explicit formula and integral representation

Wen-Hui Li¹, Feng Qi^{2,3}, Omran Kouba⁴, and Issam Kaddoura⁵

¹Zhengzhou University of Science and Technology

²Henan Polytechnic University

³Tiangong University

⁴Higher Institute for Applied Sciences and Technology, Syria

⁵International University of Beirut, Lebanese International University, Lebanon

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Abstract

In the paper, motivated by the generating function of the Catalan numbers in combinatorial number theory and with the aid of Cauchy's integral formula in complex analysis, the authors generalize the Catalan numbers and its generating function, establish an explicit formula and an integral representation for the generalization of the Catalan numbers and corresponding generating function, and derive several integral formulas and combinatorial identities.

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