Discrete Laplace method and hypergeometric continued fractions

01.02 **Katsunori Iwasaki**
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Abstract: A discrete analogue of Laplace's method for hypergeometric series containing a large parameter is developed. It aims to calculate large parameter asymptotics of the series by regarding the sum as a "discrete integral". It is particularly useful when Euler's integral representation of the series diverges so that the classical (continuous) Laplace method for integrals is not available. As an application leading asymptotics of the truncation error for Gauss's ${}_2F_1$ continued fraction is determined exactly, as well as for an infinite number of ${}_3F_2(1)$ continued fractions. Some discussions are also made about contiguous relations from which hypergeometric continued fractions are derived. This is in part a joint work with Akihito Ebisu. A more detailed account can be found in arXiv:1904.03350v1, Ramanujan J. 49 (2019), no.1, 159-213, and J. Math. Anal. Appl. 463 (2018), no.2, 593-610.