

Enumeration of multiplex juggling card sequences using generalized q -derivatives

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In 2019, Butler, Choi, Kim, and Seo introduced a new type of juggling card that represents multiplex juggling patterns in a natural bijective way. They conjectured a formula for the generating function for the number of multiplex juggling cards with capacity.

In this paper we prove their conjecture. More generally, we find an explicit formula for the generating function with any capacity. We also find an expression for the generating function for multiplex juggling card sequences by introducing a generalization of the q -derivative operator. As a consequence, we show that this generating function is a rational function.

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