A Sixteenth-order Polylogarithm Ladder

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Abstract

Using the LLL algorithm and the second author's "ladder" method, we find (conjectural) $\mathbb{Z}$-linear relations among polylogarithms of order up to 16 evaluated at powers of a single algebraic number. These relations are in accordance with theoretical predictions and are valid to an accuracy of 300 decimal digits, but we cannot prove them rigorously.