

Peter J. Larcombe

Closed Form Evaluations of Some Series Comprising Sums of Exponentiated Multiples of Two-Term and Three-Term Catalan Number Linear Combinations,

Fibonacci Quart. **53** (2015), no. 3, 253–260.

Abstract

Closed form evaluations of some infinite series comprising sums of exponentiated multiples of two-term and three-term Catalan number linear combinations are presented using three contrasting approaches. Known power series expansions of the trigonometric functions $\sin(4\alpha)$ and $\sin(6\alpha)$ each readily give a set of (four) results which are reformulated via a hypergeometric route and, additionally, using only the generating function for the Catalan sequence; the latter two methods are shown to be connected.