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*Closed Forms for Finite Sums of Weighted Products of the Sine and Cosine Functions,*

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**Abstract**

In this paper, we present closed forms for eight finite sums of weighted products of the sine/cosine functions. In each finite sum that we define, the number of factors in the summand is governed by the size of the integer parameter  $j \geq 1$ , and can be made as large as we please.

As a consequence of one of our main results, it follows that

$$\sum_{i=1}^n (2 \cos 1)^{i-1} \sin(i+1) = (2 \cos 1)^n \sin n.$$

Here the weight term in the summand is  $(2 \cos 1)^{i-1}$ .