POLYNOMIAL IDENTITIES INVOLVING CENTRAL FACTORIAL NUMBERS

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Abstract.

Contents

1. Formulae

From OEIS, note that this is not Central factorial number itself, this formula is in the mathematica package as `OEISFormula`

$$T_{\text{OEIS}}(n,k)=\frac{1}{m}\sum_{j=0}^{m}(-1)^j\binom{2m}{j}(m-j)^{2n}$$

where $m=n-k+1$. So that

$$T_{\text{OEIS}}(n,k)=\frac{1}{n-k+1}\sum_{j=0}^{n-k+1}(-1)^j\binom{2[n-k+1]}{j}([n-k+1]-j)^{2n} \tag{1.1}$$

Furthermore, T_{OEIS} may be turned into changing the summation order from $n-k+1$ to k

$$T_{\text{OEIS}}(n,n-k)=\frac{1}{k}\sum_{j=0}^{k}(-1)^j\binom{2k}{j}(k-j)^{2n}$$

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