POLYNOMIAL IDENTITIES INVOLVING CENTRAL FACTORIAL NUMBERS

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Abstract.

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1. Formulae

From OEIS, note that this is not Central factorial number itself

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

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

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

From stackoverflow, these are pure central factorial numbers already

$$k!T(n,k) = \sum_{j=0}\binom{k}{j}(-1)^j\left(\frac{1}{2}k-j\right)^n$$

Let be $(k-1)!T(n,k)$

$$(k-1)!T(n,k) = \frac{1}{k}\sum_{j=0}\binom{k}{j}(-1)^j\left(\frac{1}{2}k-j\right)^n$$

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Let be $(2k-1)!T(2n,2k)$

$$(2k-1)!T(2n,2k) = \frac{1}{2k}\sum_{j=0}\binom{2k}{j}(-1)^j(k-j)^{2n}$$

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