2.

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Let $0 \leq k \leq n$,

$$g(t) \equiv \sum_{j=0}^{n} a_j \frac{t^j}{j!}$$

and

$$f(x) \equiv 1 - e^{-x} \sum_{l=0}^{k-1} \frac{x^l}{l!},$$

then

$$(f \circ g)^{(i)}(0) = -\sum_{P \in B_I} \nabla^{\#P-1} p_{k-1}(a_0) \prod_{U \in P} a_{\#U}$$

where $(f \circ g)(t) \equiv f(g(t))$, $\#S$ is cardinality of set S, $\#I = i$, B_I is set of partitions of I, $p_j(x) \equiv \frac{x^j}{j!} e^{-x}$if $j \geq 0$ and $p_j \equiv 0$ otherwise and ∇^j is j-th backward difference operator.

Proof. Faa di Bruno formula □

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