$$\sum_{k=0}^{\infty} \frac{z^{(k)}}{k!} = \left(\frac{1}{1-x^0}\right)^z$$

$$\sum_{k=0}^{\infty} \binom{z}{k} = (1+x^0)^z$$

$$\sum_{k=0}^{\infty} \frac{z^k}{k!} = e^{x^0 \cdot z}$$

...

$$(1+x^0)^z = \left(\frac{1-x^{2\cdot 0}}{1-x^0}\right)^z$$

$$(1+x^{-s}+x^{-2s})^z = \left(\frac{1-x^{-3s}}{1-x^{-s}}\right)^z$$

$$(1+x^{-s}+x^{-2s}+x^{-3s})^z = \left(\frac{1-x^{-4s}}{1-x^{-s}}\right)^z$$

$$\left(\sum_{j=0}^{a-1} x^{-js}\right)^z = \left(\frac{1-x^{-as}}{1-x^{-s}}\right)^z$$

...

$$\sum_{k=0}^{\infty} \frac{z^{(k)}}{k!} \cdot x^{(-2sk)} = \left(\frac{1}{1-x^{-2s}}\right)^z$$

$$\sum_{k=0}^{\infty} \frac{z^{(k)}}{k!} \cdot x^{(-ask)} = \left(\frac{1}{1-x^{-as}}\right)^z$$

...

$$\lim_{s\to 0} \left(\frac{1-x^{-as}}{1-x^{-s}}\right)^z = \lim_{x\to 1} \left(\frac{1-x^{-as}}{1-x^{-s}}\right)^z = a^z$$

$$[\frac{1}{1-x^0}]_n^+=\sum_{j=0}^{n}1$$

$$[(\frac{1}{1-x^0})^2]_n^+=\sum_{j=0}^{n}\sum_{k=0}^{n-j}1$$

$$[(\frac{1}{1-x^0})^3]_n^+=\sum_{j=0}^{n}\sum_{k=0}^{n-j}\sum_{l=0}^{n-j-k}0$$

$$[(\frac{1}{1-x^0})^k]_n^+=\sum_{j=0}^{n}[(\frac{1}{1-x^0})^{k-1}]_{n-j}^+$$

$$[(\frac{1}{1-x^0})^0]_n^+=\mathbf{1}_{n\geq 0}(n)$$

...

$$[\frac{1}{1-x^0}-1]_n^+=\sum_{j=1}^{n}1$$

$$[(\frac{1}{1-x^0}-1)^2]_n^+=\sum_{j=1}^{n-1}\sum_{k=1}^{n-j}1$$

$$[(\frac{1}{1-x^0}-1)^3]_n^+=\sum_{j=1}^{n-2}\sum_{k=1}^{n-j-1}\sum_{l=1}^{n-j-k}1$$

$$[(\frac{1}{1-x^{-s}}-1)^k]_n^+=0\ if\ k>n$$

$$[(\frac{1}{1-x^0}-1)^k]_n^+=\sum_{j=1}^{n-k+1}[(\frac{1}{1-x^0}-1)^{k-1}]_{n-j}^+$$

$$[(\frac{1}{1-x^0}-1)^0]_n^+=\mathbf{1}_{n\geq 0}(n)$$

...

$$[\log(\frac{1}{1-x^0})]_n^+=\sum_{j=1}^{n}\frac{1}{j}$$

$$[(\log(\frac{1}{1-x^0}))^2]_n^+=\sum_{j=1}^{n-1}\sum_{k=1}^{n-j}\frac{1}{j\cdot k}$$

$$[\log((\frac{1}{1-x^0}))^3]_n^+=\sum_{j=1}^{n-2}\sum_{k=1}^{n-j-1}\sum_{l=1}^{n-j-k}\frac{1}{j\cdot k\cdot l}$$

$$[(\log(\frac{1}{1-x^0}))^k]_n^+=0\ if\ k>n$$

$$[(\log(\frac{1}{1-x^0}))^k]_n^+=\sum_{j=1}^{n-k+1}\frac{1}{j}\cdot[(\log(\frac{1}{1-x^0}))^{k-1}]_{n-j}^+$$

$$[(\log(\frac{1}{1-x^0}))^0]_n^+=\mathbf{1}_{n\geq 0}(n)$$

...

$$[(\frac{1}{1-x^0})^z]_n^+=\sum_{k=0}\binom{z}{k}[(\frac{1}{1-x^0}-1)^k]_n^+$$

$$[(\frac{1}{1-x^0}-1)^k]_n^+=\sum_{j=0}^{k}(-1)^{k-j}\binom{k}{j}[(\frac{1}{1-x^0})^j]_n^+$$

$$[\log(\frac{1}{1-x^0})]_n^+=\sum_{k=1}\frac{(-1)^{k+1}}{k}[(\frac{1}{1-x^0}-1)^k]_n^+$$

$$[\log(\frac{1}{1-x^0})]_n^+=\lim_{z\to 0}\frac{\partial}{\partial z}[(\frac{1}{1-x^0})^z]_n^+$$

$$[(\log(\frac{1}{1-x^{-s}}))^k]_n^+=\lim_{z\to 0}\frac{\partial^k}{\partial z^k}[(\frac{1}{1-x^{-s}})^z]_n^+$$

$$[(\frac{1}{1-x^0})^z]_n^+=\sum_{k=0}\frac{z^k}{k!}[(\log(\frac{1}{1-x^0}))^k]_n^+$$

...

$$[e]_n^+ = \sum_{j=0}^{n} \frac{1}{j!}$$

$$[e^2]_n^+ = \sum_{j=0}^{n} \sum_{k=0}^{n-j} \frac{1}{j! \cdot k!}$$

$$[e^3]_n^+ = \sum_{j=0}^{n} \sum_{k=0}^{n-j} \sum_{l=0}^{n-j-k} \frac{1}{j! \cdot k! \cdot l!}$$

$$[e^k]_n^+ = \sum_{j=0}^{n} \frac{1}{j!} \cdot [e^{(k-1)\cdot x^0}]_{n-j}^+$$

$$[e^0]_n^+ = \mathbf{1}_{n\geq 0}(n)$$

$$[e^z]_n^+ = \sum_{k=0}^{n} \frac{z^k}{k!}$$

$$\ldots$$

$$[e-1]_n^+ = \sum_{j=1}^{n} \frac{1}{j!}$$

$$[(e-1)^2]_n^+ = \sum_{j=1}^{n-1} \sum_{k=1}^{n-j} \frac{1}{j! \cdot k!}$$

$$[(e-1)^3]_n^+ = \sum_{j=1}^{n-2} \sum_{k=1}^{n-1} \sum_{l=1}^{n-j-k} \frac{1}{j! \cdot k! \cdot l!}$$

$$[(e-1)^k]_n^+ = \sum_{j=1}^{n-k+1} \frac{1}{j!} \cdot [(e-1)^{k-1}]_{n-j}^+$$

$$[e^0]_n^+ = \mathbf{1}_{n\geq 0}(n)$$

$$\ldots$$

$$[\log e]_n^+ = (n>0)\,?\,1:0$$

$$[\log^2 e]_n^+ = (n>1)\,?\,1:0$$

$$[\log^3 e]_n^+ = (n>2)\,?\,1:0$$

$$[\log^k e]_n^+ = 0 \; if \; k>n$$

$$[\log^k e]_n^+ = (n\geq k)\,?\,[\log^{k-1} e]_n^+ : 0$$

$$[(\log(e^{x^0}))^0]_n^+ = \mathbf{1}_{n\geq 0}(n)$$

$$\ldots$$

$$[(\frac{1}{1-x^0})^z]_n^+ = \sum_{k=0} \binom{z}{k} [(\frac{1}{1-x^0}-1)^k]_n^+$$

$$[(e-1)^k]_n^+ = \sum_{j=0}^{k} (-1)^{k-j} \binom{k}{j} [e^j]_n^+$$

$$[\log(\frac{1}{1-x^0})]_n^+ = \sum_{k=1} \frac{(-1)^{k+1}}{k} [(e-1)^k]_n^+$$

$$[\log e]_n^+ = \lim_{z\to 0} \frac{\partial}{\partial z} [e^z]_n^+$$

$$[\log^k e]_n^+ = \lim_{z\to 0} \frac{\partial^k}{\partial z^k} [e^z]_n^+$$

$$[e^z]_n^+ = \sum_{k=0} \frac{z^k}{k!} [\log^k e]_n^+$$

$$\{I+n\}^{+\Sigma}=\sum_{j=0}^{n}1$$

$$\{(I+n)^2\}^{+\Sigma}=\sum_{j=0}^{n}\sum_{k=0}^{n-j}1$$

$$\{(I+n)^3\}^{+\Sigma}=\sum_{j=0}^{n}\sum_{k=0}^{n-j}\sum_{l=0}^{n-j-k}1$$

$$\{(I+n)^k\}^{+\Sigma}=\sum_{j=0}^{n}\{(I+(n-j))^{k-1}\}^{+\Sigma}$$

$$\{(I+n)^0\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

$$\{(I+n)^z\}^{+\Sigma}=\sum_{k=0}^{n}\frac{z^{(k)}}{k!}=\frac{(z+1)^{(n)}}{n!}$$

...

$$\{n\}^{+\Sigma}=\sum_{j=1}^{n}1$$

$$\{n^2\}^{+\Sigma}=\sum_{j=1}^{n-1}\sum_{k=1}^{n-j}1$$

$$\{n^3\}^{+\Sigma}=\sum_{j=1}^{n-2}\sum_{k=1}^{n-j-1}\sum_{l=1}^{n-j-k}1$$

$$\{n^k\}^{+\Sigma}=0\ if\ k>n$$

$$\{n^k\}^{+\Sigma}=\sum_{j=1}^{n-k+1}\{(n-j)^{k-1}\}^{+\Sigma}$$

$$\{n^0\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

$$\{n^z\}^{+\Sigma}=\binom{n}{z}$$

...

$$\{\log(I+n)\}^{+\Sigma}=\sum_{j=1}^{n}\frac{1}{j}$$

$$\{\log^2(I+n)\}^{+\Sigma}=\sum_{j=1}^{n-1}\sum_{k=1}^{n-j}\frac{1}{j\cdot k}$$

$$\{\log^3(I+n)\}^{+\Sigma}=\sum_{j=1}^{n-2}\sum_{k=1}^{n-j-1}\sum_{l=1}^{n-j-k}\frac{1}{j\cdot k\cdot l}$$

$$\{\log^k(I+n)\}^{+\Sigma}=0\ if\ k>n$$

$$\{\log^k(I+n)\}^{+\Sigma}=\sum_{j=1}^{n-k+1}\frac{1}{j}\cdot\{\log^{k-1}(I+n-j)\}^{+\Sigma}$$

$$\{\log^0(I+n)\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

...

$$\{(I+n)^z\}^{+\Sigma}=\sum_{k=0}\binom{z}{k}\{n^k\}^{+\Sigma}$$

$$\{n^k\}^{+\Sigma}=\sum_{j=0}^{k}(-1)^{k-j}\binom{k}{j}\{(I+n)^j\}^{+\Sigma}$$

$$\{\log(I+n)\}^{+\Sigma}=\sum_{k=1}\frac{(-1)^{k+1}}{k}\{n^k\}^{+\Sigma}$$

$$\{\log(I+n)\}^{+\Sigma}=\lim_{z\to 0}\frac{\partial}{\partial z}\{(I+n)^z\}^{+\Sigma}$$

$$\{\log^k(I+n)\}^{+\Sigma}=\lim_{z\to 0}\frac{\partial^k}{\partial z^k}\{(I+n)^z\}^{+\Sigma}$$

$$\{(I+n)^z\}^{+\Sigma}=\sum_{k=0}\frac{z^k}{k!}\{\log^k(I+n)\}^{+\Sigma}$$

...

$$\{I+e_n\}^{+\Sigma}=\sum_{j=0}^{n}\frac{1}{j!}$$

$$\{(I+e_n)^2\}^{+\Sigma}=\sum_{j=0}^{n}\sum_{k=0}^{n-j}\frac{1}{j!\cdot k!}$$

$$\{(I+e_n)^3\}^{+\Sigma}=\sum_{j=0}^{n}\sum_{k=0}^{n-j}\sum_{l=0}^{n-j-k}\frac{1}{j!\cdot k!\cdot l!}$$

$$\{(I+e_n)^k\}^{+\Sigma}=\sum_{j=0}^{n}\frac{1}{j!}\cdot\{(I+e_{n-j})^{k-1}\}^{+\Sigma}$$

$$\{(I+e_n)^0\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

$$\{(I+e_n)^z\}^{+\Sigma}=\sum_{k=0}^{n}\frac{z^k}{k!}$$

…

$$\{e_n\}^{+\Sigma}=\sum_{j=1}^{n}\frac{1}{j!}$$

$$\{e_n^2\}^{+\Sigma}=\sum_{j=1}^{n-1}\sum_{k=1}^{n-j}\frac{1}{j!\cdot k!}$$

$$\{e_n^3\}^{+\Sigma}=\sum_{j=1}^{n}\sum_{k=1}^{n-j}\sum_{l=1}^{n-j-k}\frac{1}{j!\cdot k!\cdot l!}$$

$$\{e_n^k\}^{+\Sigma}=\sum_{j=1}^{n-k+1}\frac{1}{j!}\cdot\{e_{n-j}^{k-1}\}^{+\Sigma}$$

$$\{e_n^0\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

…

$$\{\log(I+e_n)\}^{+\Sigma}=(n>0)?1:0$$

$$\{\log^2(I+e_n)\}^{+\Sigma}=(n>1)?1:0$$

$$\{\log^3(I+e_n)\}^{+\Sigma}=(n>2)?1:0$$

$$\{\log^k(I+e_n)\}^{+\Sigma}=0\, if\ k>n$$

$$\{\log^k(I+e_n)\}^{+\Sigma}=(n\geq k)?\{\log^{k-1}(I+e_n)\}^{+\Sigma}:0$$

$$\{\log^0(I+e_n)\}^{+\Sigma}=\mathbf{1}_{n\geq 0}(n)$$

…

$$[(\frac{1}{1-x^0})^z]_n^+=\sum_{k=0}\binom{z}{k}[(\frac{1}{1-x^0}-1)^k]_n^+$$

$$\{(I+e_n)^z\}^{+\Sigma}=\sum_{k=0}\binom{z}{k}\{e_n^k\}^{+\Sigma}$$

$$\{e_n^k\}^{+\Sigma}=\sum_{j=0}^{k}(-1)^{k-j}\binom{k}{j}\{(I+e_n)^j\}^{+\Sigma}$$

$$[\log(\frac{1}{1-x^0})]_n^+=\sum_{k=1}\frac{(-1)^{k+1}}{k}\{e_n^k\}^{+\Sigma}$$

$$\{\log(I+e_n)\}^{+\Sigma}=\lim_{z\to 0}\frac{\partial}{\partial z}\{(I+e_n)^z\}^{+\Sigma}$$

$$\{\log^k(I+e_n)\}^{+\Sigma}=\lim_{z\to 0}\frac{\partial^k}{\partial z^k}\{(I+e_n)^z\}^{+\Sigma}$$

$$\{(I+e_n)^z\}^{+\Sigma}=\sum_{k=0}\frac{z^k}{k!}\{\log^k(I+e_n)\}^{+\Sigma}$$

$$\{e_x^k\}=\sum_{j=0}^{\infty}\frac{1}{j!}\cdot(\lim_{t\to 0}\frac{\partial^j}{\partial t^j}(e^t-1)^k)\{\log^j(I+e_x)\}$$

$$\{e_x^k\}=\sum_{j=0}^{\infty}\frac{S(j,k)\cdot k!}{j!}\cdot\{\log^j(I+e_x)\}$$

where $S(j,k)$ are Stirling numbers of the second kind.

$$\{\log(I+n)\}^{+\Sigma} = \sum_{k=1} \frac{1}{k} \{\log(I+e_{\lfloor \frac{n}{k} \rfloor})\}^{+\Sigma}$$

$$\{\log(I+e_n)\}^{+\Sigma} = \sum_{k=1} \frac{1}{k} \{\log(I+\lfloor \frac{n}{k} \rfloor)\}^{+\Sigma}$$

$$\{(I+n)^z\}^{+\Sigma} = \sum_{a+2b+3c+4d+\ldots\le n} \nabla\{e_a^z\}\cdot\nabla\{e_b^{\frac{z}{2}}\}\cdot\nabla\{e_c^{\frac{z}{3}}\}\cdot\nabla\{e_d^{\frac{z}{4}}$$

$$[(\frac{1}{1-x})^z]_n = \sum_{a_1+2a_2+\ldots+k\cdot a_k\le n} \prod_k \nabla[e^{\frac{z}{k}}]_{a_k}$$

$$\{e_n^z\}^{+\Sigma} = \sum_{a+2b+3c+4d+\ldots\le n} \nabla\{(I+a)^z\}^{+\Sigma}\cdot\nabla\{(I+b)^{-\frac{z}{2}}\}^{+\Sigma}\cdot\nabla\{$$

$$[e^z]_n = \sum_{a_1+2a_2+\ldots+k\cdot a_k\le n} \prod_k \nabla[(\frac{1}{1-x})^{\mu(k)\cdot\frac{z}{k}}]_{a_k}$$

$$\{(I+n)^z\}^{+\Sigma} = \sum_{a_1+2a_2+\ldots+k\cdot a_k\le n} \prod_j \nabla\{(I+e_{a_j})^{\frac{z}{j}}\}^{+\Sigma}$$

$$\{(I+e_n)^z\}^{+\Sigma} = \sum_{a_1+2a_2+\ldots+k\cdot a_k\le n} \prod_j \nabla\{(I+a_j)^{\mu(k)\cdot\frac{z}{j}}\}^{+\Sigma}$$