$$C_j=\left(\lim_{t\to 0}\frac{\partial^j}{\partial t^j}\frac{t}{\log(1+t)}\right)$$

$$x^k=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot x^{k+j-1}\cdot\log(1+x)$$

$$\{x^k\}=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\{x^{k+j-1}\cdot\log(1+x)\}$$

$$\{x^k\}=$$

	$\int$	$\sum$
+	$\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\int_0^x\int_0^{x-t}\frac{\partial}{\partial t}\{t^{k+j-1}\}^{+\int}\cdot\frac{\partial}{\partial u}\{\log(1+u)\}^{+\int}du\,dt$	$\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\sum_{t=1}^{x}\sum_{u=1}^{x-t}\nabla_t\{t^{k+j-1}\}^{+\Sigma}\cdot\nabla_u\{\log(1+u)\}^{+\Sigma}$
*	$\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\int_1^x\int_1^{\frac{x}{t}}\frac{\partial}{\partial t}\{t^{k+j-1}\}^{*\int}\cdot\frac{\partial}{\partial u}\{\log(1+u)\}^{*\int}du\,dt$	$\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\sum_{t=2}^{x}\sum_{u=2}^{\lfloor\frac{x}{t}\rfloor}\nabla_t\{t^{k+j-1}\}^{*\Sigma}\cdot\nabla_u\{\log(1+u)\}^{*\Sigma}$

$$\{x^k\}=$$

	$\int$	$\sum$
+	$\frac{x^k}{k!}=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\int_0^x\int_0^{x-t}\frac{t^{k+j-2}}{(k+j-2)!}\cdot\left(\frac{1}{u}-\frac{e^{-u}}{u}\right)du\,dt$	$\binom{x}{k}=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\sum_{t=1}^{x}\sum_{u=1}^{x-t}\binom{t-1}{k+j-2}\cdot\frac{1}{u}$
*	$(-1)^{-k}P(k,-\log x)=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\int_1^x\int_1^{\frac{x}{t}}\frac{\log^{k+j-2}t}{(k+j-2)}\cdot\left(\frac{1}{\log u}-\frac{1}{u\log u}\right)du\,dt$	$D_k'(x)=\sum_{j=0}^{\infty}\frac{C_j}{j!}\cdot\sum_{t=2}^{x}\sum_{u=2}^{\lfloor\frac{x}{t}\rfloor}d_{k+j-1}'(t)\cdot\kappa(u)$

$$\sum_{k=1} \frac{(-1)^{k+1}}{k} x^{k+a} = x^a \cdot \log(I+x)$$

$$\sum_{k=1} \frac{(-1)^{k+1}}{k} \{x^{k+a}\} = \{x^a \cdot \log(I+x)\}$$

	$\int$	$\sum$
+	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \{x^{k+a}\}^{+\int} = \int_0^x \int_0^{x-t} \frac{\partial}{\partial t}\{t^a\}^{+\int} \cdot \frac{\partial}{\partial u}\{\log(I+u)\}^{+\int} du\, dt$	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \{x^{k+a}\}^{+\Sigma} = \sum_{t=1}^{x} \sum_{u=1}^{x-t} \nabla_t \{t^a\}^{+\Sigma} \cdot \nabla_u \{\log(I+u)\}^{+\Sigma}$
*	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \{x^{k+a}\}^{*\int} = \int_1^x \int_1^{\frac{x}{t}} \frac{\partial}{\partial t}\{t^a\}^{*\int} \cdot \frac{\partial}{\partial u}\{\log(I+u)\}^{*\int} du\, dt$	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \{x^{k+a}\}^{*\Sigma} = \sum_{t=2}^{x} \sum_{u=2}^{\lfloor \frac{x}{t} \rfloor} \nabla_t \{t^a\}^{*\Sigma} \cdot \nabla_u \{\log(I+u)\}^{*\Sigma}$

	$\int$	$\sum$
+	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \cdot \frac{x^{k+a}}{(k+a)!} = \int_0^x \int_0^{x-t} \frac{t^{a-1}}{(a-1)!} \cdot (\frac{1}{u} - \frac{e^{-u}}{u}) du\, dt$	$\sum_{k=1} \frac{(-1)^{k+1}}{k} \binom{x}{k+a} = \sum_{t=1}^{x} \sum_{u=1}^{x-t} \binom{t-1}{a-1} \cdot \frac{1}{u}$
*	$\sum_{k=1} \frac{(-1)^{k+1}}{k} (-1)^{-(k+a)} P(k+a, -\log x) = \int_1^x \int_1^{\frac{x}{t}} \frac{\log^{a-1} t}{(a-1)!} \cdot (\frac{1}{\log u} - \frac{1}{u \log u}) du\, dt$	$\sum_{k=1} \frac{(-1)^{k+1}}{k} D_{k+a}'(x) = \sum_{t=2}^{x} \sum_{u=2}^{\lfloor \frac{x}{t} \rfloor} d_a'(t) \cdot \kappa(u)$

$$\log^a(1+x)=\sum_{k=1}\frac{(-1)^{k+1}}{k}x^k\cdot\log^{a-1}(1+x)$$

$$\log^a(1+x)=\sum_{k=0}\frac{B_k}{k!}x\cdot\log^{k+a-1}(1+x)$$

$$\log(1+x)=\frac{x}{1+x}+\sum_{k=2}\frac{(-1)^k}{k(k-1)}\cdot\frac{x^k}{1+x}$$

$$\log(1+x)=\sum_{k=1}(-1)^{k+1}\cdot H_k\cdot x^k\cdot(1+x)$$

$$\log(1+x)=\sum_{k=1}(-1)^{k+1}\cdot H_k\cdot x^k\cdot(1+x)$$

$$\{\log(1+x)\}=\sum_{k=1}(-1)^{k+1}\cdot H_k\cdot\{x^k\cdot(1+x)\}$$

$$\{\log(1+x)\}=\sum_{k=1}(-1)^{k+1}\cdot H_k\cdot\{x^k+x^{k+1}\}$$

	$\int$	$\sum$
+		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=0}^{x}\sum_{u=1}^{x-t}\nabla_t\{t^k\}^{+\Sigma}\cdot\nabla_u\{I+u\}^{+\Sigma}$
*		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=1}^{x}\sum_{u=2}^{\lfloor\frac{x}{t}\rfloor}\nabla_t\{t^k\}^{*\Sigma}\cdot\nabla_u\{I+u\}^{*\Sigma}$

	$\int$	$\sum$
+		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=0}^{x}\sum_{u=1}^{x-t}\binom{t-1}{k-1}\cdot u$
*		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=2}^{x}\sum_{u=1}^{\lfloor\frac{x}{t}\rfloor}d_k'(t)$

	$\int$	$\sum$
+		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=0}^{x}\binom{t-1}{k-1}\cdot\binom{t-x}{2}$
*		$\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot\sum_{t=2}^{x}\lfloor\frac{x}{t}\rfloor\cdot d_k'(t)$

	$\int$	$\sum$
+		$H_x=\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot(\binom{x}{k}+\binom{x}{k+1})$
*		$\Pi(x)=\sum_{k=0}^{\infty}(-1)^{k+1}\cdot H_k\cdot(D_k'(x)+D_{k+1}'(x))$

$$(\log\zeta(s))^a=\sum_{k=1}\frac{(-1)^{k+1}}{k}(\zeta(s)-1)^k(\log\zeta(s))^{a-1}$$

$$\log\zeta(s)=\sum_{k=0}\frac{B_k}{k!}(\zeta(s)-1)\cdot\lim_{z\to 0}\frac{\partial^k}{\partial z^k}\zeta(s)^z$$

$$\lim_{z\to 0}\frac{\partial^a}{\partial z^a}\zeta(s)^z=\sum_{k=0}\frac{B_k}{k!}(\zeta(s)-1)\cdot\lim_{z\to 0}\frac{\partial^{k+a-1}}{\partial z^{k+a-1}}\zeta(s)^z$$

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

$$(1-x)^z=\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot x^k$$

Note! The following two actually converge for arbitrary z! Neat!

$$(1-x)^z=\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot 2^{z-k}\cdot(1+x)^k$$

$$(1+x)^z=\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot 2^{z-k}\cdot(1-x)^k$$

$$\log(1+x)=\lim_{z\to 0}\frac{\partial}{\partial z}\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot 2^{z-k}\cdot(1-x)^k$$

$$\log(1+x)=\log 2-\sum_{k=1}\frac{1}{2^k\cdot k}\cdot(1-x)^k$$

$$\{\log(1+x)\}=\log 2-\sum_{k=1}\frac{1}{2^k\cdot k}\cdot\{(1-x)^k\}$$

$$\Pi(x)=\lim_{z\to 0}\frac{\partial}{\partial z}\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot 2^{z-k}\cdot\{(1-x)^k\}^{*\Sigma}$$

$$\Pi(x)=\log 2-\sum_{k=1}\frac{1}{2^k\cdot k}\cdot\{(1-x)^k\}^{*\Sigma}$$

$$\log(1-x)=-\sum_{k=1}\frac{x^k}{k}$$

$$\{(I-x)^z\}=\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot\{x^k\}$$

$$(1-x)^z=\sum_{k=0}(-1)^k\cdot\binom{z}{k}\cdot x^k$$

....

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

$$(a+x)^z=\sum_{k=0}\binom{z}{k}a^{z-k}\cdot x^k$$

$$(a+bx)^z=\sum_{k=0}\binom{z}{k}a^{z-k}\cdot b^k\cdot x^k$$

$$(a+bx)^z=b^z\cdot\left(\frac{a}{b}+x\right)^z=a^z\cdot\left(1+\frac{b}{a}x\right)^z$$

$$\{(a+bx)^z\}=\sum_{k=0}\binom{z}{k}a^{z-k}\cdot b^k\cdot\{x^k\}$$

$$\{\log(aI+ax)\}=\log a+\{\log(I+x)\}$$

Revisit an updated version of $\frac{1-x^k}{1-x}=1+x+x^2+...+x^k$

$$\nabla[2^z]_n=\binom{z}{n}=\sum_{k=0}^{\frac{n}{2}}\nabla[\infty^z]_{n-2k}\cdot\nabla[\infty^{-z}]_k$$

$$\binom{z}{n}=\sum_{k=0}^{\frac{n}{2}}\frac{z^{(n-2k)}}{(n-2k)!}\cdot\frac{(-z)^{(k)}}{k!}$$

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

$$\sum_{j=0}^{n}\binom{z}{j}=\sum_{k=0}^{\frac{n}{2}}\sum_{j=0}^{n-2k}\frac{z^{(j)}}{j!}\cdot\frac{(-z)^{(k)}}{k!}$$

$$\sum_{j=0}^{n}\binom{z}{j}=\sum_{j+2k\leq n}\nabla_j\{(I+j)^z\}^{+\Sigma}\cdot\nabla_k\{(I+k)^{-z}\}^{+\Sigma}$$

$$\sum_{j=0}^{x}\binom{z}{j}=\{(\frac{I+x}{I+\frac{x}{2}})^z\}^{+\Sigma}$$

$$\binom{z}{x}=\nabla_x\cdot\{(\frac{I+x}{I+\frac{x}{2}})^z\}^{+\Sigma}$$

$$\{z^x\}^{+\Sigma}=\nabla_x\cdot\{(\frac{I+x}{I+\frac{x}{2}})^z\}^{+\Sigma}$$

$$\{\log(\frac{I+x}{I+\frac{x}{2}})\}^{+\Sigma}=\{\log(I+x)\}^{+\Sigma}-\{\log(I+\frac{x}{2})\}^{+\Sigma}$$

$$\{\log(\frac{I+x}{I+\frac{x}{2}})\}^{+\Sigma}=H_x-H_{\lfloor\frac{x}{2}\rfloor}$$

$$\{(I+x)\cdot(I+y)\}^{+\Sigma}=\sum_{\frac{t_1}{x}+\frac{t_2}{y}\leq 1}1$$

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

...

$$\sum_{j=0}^{n}\lambda(j)^{\{z\}}=\sum_{j+k^2\leq n}\nabla_j\{(I+j)^{-z}\}^{*\Sigma}\cdot\nabla_k\{(I+k)^z\}^{*\Sigma}$$

$$\{\log(\frac{I+x^{\frac{1}{2}}}{I+x})\}^{*\Sigma}=\{\log(I+x^{\frac{1}{2}})\}^{*\Sigma}-\{\log(I+x)\}^{*\Sigma}$$

$$\nabla_x\{(I+x)^z\}^{*\Sigma}=\prod_{p^k|x}\nabla_k\{(I+k)^z\}^{+\Sigma}$$

$$\{(I+x)^z\}^{*\Sigma}=\sum_{j=1}^{n}\sum_{p^k|j}\nabla_k\{(I+k)^z\}^{+\Sigma}$$

$$\{(\frac{I+x}{I+x^{\frac{1}{2}}})^z\}^{*\Sigma}=\sum_{j=1}^{n}\sum_{p^a|j}\nabla_k\{(\frac{I+k}{I+\frac{k}{2}})^z\}^{+\Sigma}$$

…

$$\lim_{x\to\infty}(\frac{1+x}{1+\frac{x}{k}})^z=k^z$$

and also

$$\lim_{x\to\infty}\{(\frac{I+x}{I+\frac{x}{k}})^z\}^{*\Sigma}=k^z$$

and also

$$\lim_{x\to\infty}\{(\frac{I+x}{I+\frac{x}{k}})^z\}^{*\Sigma}=k^z$$

...

$$[(\frac{\zeta_{1/2}(0)}{\zeta(0)})]_n\quad\sum_{j=1}^{n}\lambda(j)$$
$$[(\frac{\zeta_{1/2}(0)}{\zeta(0)})^{-1}]_n\quad\sum_{j=1}^{n}\mu(j)$$

...

$$[\prod_{k=1}\zeta_{1/k}(0)]_n\quad\sum_{j=1}^{n}a(j)$$
$$\{\prod_{k=1}(I+\frac{x}{k})^z\}$$
$$\sum_{a+2b+3c+\ldots\le x}\nabla_a\{(I+a)^z\}^{+\Sigma}\cdot\nabla_b\{(I+b)^z\}^{+\Sigma}\cdot\nabla_c\{(I+c)^z\}^{+\Sigma}\cdot\ldots$$
$$\sum_{a=0}^{x}t_z(a)\cdot\sum_{b=0}^{\frac{x-a}{2}}t_z(b)\cdot\sum_{c=0}^{\frac{x-a-2b}{3}}t_z(c)\cdot\ldots$$

...

$$\{(\prod_{k=1}(I+\frac{x}{k})^{\frac{\mu(k)}{k}})^{z}\}$$

$$\sum_{a+2b+3c+...\leq x}\nabla_a\{(I+a)^{z}\}^{*\Sigma}\cdot\nabla_b\{(I+b)^{-\frac{z}{2}}\}^{*\Sigma}\cdot\nabla_c\{(I+c)^{-\frac{z}{c}}\}^{*\Sigma}\cdot...$$

$$\{\frac{I+x}{I+\frac{x}{k}}\}^{*\Sigma}=\frac{1-x^{k}}{1-x}=1+x+x^{2}+...+x^{k}$$

$$\{\prod_{k=1}(I+\frac{x}{k})\}=\prod_{k=1}\frac{1}{1-x^{k}}$$

$$=\frac{x}{1-x-x^{2}}$$

(so the additive log delta of fibonacci sequence is this:)

http://oeis.org/A001350

```
am[n_,0]:=UnitStep[n]
am[n_,k_]:=Sum[Fibonacci[j]am[n-j,k-1],{j,1,n}]
amz[n_,z_]:=Sum[bin[z,k]am[n,k],{k,0,n}]
damz[n_,z_]:=amz[n,z]-amz[n-1,z]
Table[D[damz[j,z],z]/.z->0,{j,1,10}]
Out[745]= {1,1/2,4/3,5/4,11/5,8/3,29/7,45/8,76/9,121/10}
```