$\mathcal{Z}$–transformation

$$\mathcal{Z}[f_n] = \sum_{n=0}^{\infty} \frac{f_n}{z^n}$$

nth term of the sequence	$\mathcal{Z}$–transform	nth term of the sequence	$\mathcal{Z}$–transform
f_n	$\varphi(z)$	$\mathbf{1}(n)$	$\frac{z}{z-1}$
$\alpha f_n + \beta g_n$	$\alpha\varphi(z) + \beta\psi(z)$	$\mathbf{1}(n-k)$	$\frac{z}{z^k(z-1)}$
f_{n+1}	$z\Big[\varphi(z) - f_0\Big]$	a^n	$\frac{z}{z-a}$
f_{n+2}	$z^2\Big[\varphi(z) - f_0 - \frac{f_1}{z}\Big]$	$(-1)^n$	$\frac{z}{z+1}$
f_{n+k}, $k \in \mathbf{N}$	$z^k\Big[\varphi(z) - \sum_{i=0}^{k-1} \frac{f_i}{z^i}\Big]$	n	$\frac{z}{(z-1)^2}$
$f_{n-1}\mathbf{1}(n)$	$\frac{1}{z}\Big[\varphi(z) + f_{-1}z\Big]$	n^2	$\frac{z(z+1)}{(z-1)^3}$
$f_{n-2}\mathbf{1}(n)$	$\frac{1}{z^2}\Big[\varphi(z) + f_{-1}z + f_{-2}z^2\Big]$	na^n	$\frac{az}{(z-a)^2}$
$f_{n-k}\mathbf{1}(n)$, $k \in \mathbf{N}$	$\frac{1}{z^k}\Big[\varphi(z) + \sum_{i=0}^{k-1} f_{-i}z^i\Big]$	n^2a^n	$\frac{az(z+a)}{(z-a)^3}$
$f_{n-1}\mathbf{1}(n-1)$	$\frac{1}{z}\ \varphi(z)$	$\delta(n)$	1
$f_{n-2}\mathbf{1}(n-2)$	$\frac{1}{z^2}\ \varphi(z)$	$\delta(n-1)$	$\frac{1}{z}$
$f_{n-k}\mathbf{1}(n-k)$, $k \in \mathbf{N}$	$\frac{1}{z^k}\ \varphi(z)$	$\delta(n-k)$, $k \in \mathbf{N}$	$\frac{1}{z^k}$
$a^n f_n$	$\varphi(\frac{z}{a})$	$\sin n\alpha$	$\frac{z\sin\alpha}{z^2 - 2z\cos\alpha + 1}$
nf_n	$-z\varphi'(z)$	$\cos n\alpha$	$\frac{z(z-\cos\alpha)}{z^2 - 2z\cos\alpha + 1}$
$n^2 f_n$	$z^2\varphi''(z) + z\varphi'(z)$	$\sin n\frac{\pi}{2}$	$\frac{z}{z^2+1}$
$f_n * g_n$	$\varphi(z)\psi(z)$	$\cos n\frac{\pi}{2}$	$\frac{z^2}{z^2+1}$
$\sum_{k=0}^{n} g_k$	$\frac{z}{z-1}\ \varphi(z)$	$\frac{1}{n!}$	$e^{\frac{1}{z}}$