Z TRANSFORMS

$$Z\{f(t)\} = \tilde{f}(z) = \sum_{k=0}^{\infty} f(kT) z^{-k}$$

function	transform
$\delta_{t,nT}$	$z^{-n} (n \geq 0)$
e^{-at}	$\dfrac{z}{z - e^{-aT}}$
te^{-at}	$\dfrac{Tze^{-aT}}{(z - e^{-aT})^2}$
$t^2 e^{-at}$	$\dfrac{T^2 ze^{-aT}(z + e^{-aT})}{(z - e^{-aT})^3}$
$\sinh at$	$\dfrac{z \sinh aT}{z^2 - 2z \cosh aT + 1}$
$\cosh at$	$\dfrac{z(z - \cosh aT)}{z^2 - 2z \cosh aT + 1}$
$e^{-at} \sin \omega t$	$\dfrac{ze^{-aT} \sin \omega T}{z^2 - 2ze^{-aT} \cos \omega T + e^{-2aT}}$
$e^{-at} \cos \omega t$	$\dfrac{z(z - e^{-aT} \cos \omega T)}{z^2 - 2ze^{-aT} \cos \omega T + e^{-2aT}}$
$te^{-at} \sin \omega t$	$\dfrac{Tze^{-aT}(z^2 - e^{-2aT}) \sin \omega T}{(z^2 - 2ze^{-aT} \cos \omega T + e^{-2aT})^2}$
$te^{-at} \cos \omega t$	$\dfrac{Tze^{-aT}(z^2 \cos \omega T - 2ze^{-aT} + e^{-2aT} \cos \omega T)}{(z^2 - 2ze^{-aT} \cos \omega T + e^{-2aT})^2}$