How to convert between different filter representations

to → from ↓	a, b coefficients	α,β coefficients	impulse response	frequency response	transfer function	gain and pole-zero diagram
a, b coefficients	identity	subtraction of y terms	MA: h=a AR + ARMA: recursion	substitute $x=e^{ikn}$	write using z^{-1} and extract	through transfer function
α,β coefficients	addition of y terms	identity	same as a,b	same as a,b	same as a,b	same as a,b
impulse response	MA: a=h ARMA: recursion	through a,b	identity	DFT	zT	through transfer function
frequency response	through IR or transfer function	same as a,b	iDFT	identity	analytic continuation	through transfer function
transfer function	through α,β	$B(z)\,Y(z)$ $=$ $A(z)\,X(z)$	izT	substitute $z = e^{i\omega}$	identity	find roots
gain and pole-zero diagram	through transfer function	through transfer function	through transfer function	substitution	multiply terms to get polynomial	identity