

Fourier Pairs

Electrical Engineering

The transform pairs and properties worth carrying in your head.

Every row also reads backwards, by duality.

Time domain	Frequency domain
Impulse $\delta(t)$	Flat: equal at every frequency
Constant 1	Impulse at zero frequency
Rectangular pulse, width T	sinc shape, first null at $1/T$
Gaussian	Gaussian, width inverted
$\cos(2\pi f_o t)$	A pair of impulses at $\pm f_o$
Multiplying in time	Convolving in frequency
Delay by t_o	Phase ramp, magnitude unchanged

Narrow in one domain is wide in the other. That one fact explains bandwidth, pulse spreading and the uncertainty limit.