Trasformate di Fourier di alcune funzioni elementari

	$f(x)$	$F(k)$
impulso esponenziale	$\mathrm{e}^{-ax}H(x) \quad (a > 0)$	$\dfrac{1}{a + \mathbf{i}k}$
	$\mathrm{e}^{ax}H(-x) \quad (a > 0)$	$\dfrac{1}{a - \mathbf{i}k}$
impulso pari	$\mathrm{e}^{-a|x|} \quad (a > 0)$	$\dfrac{2a}{a^2 + k^2}$
impulso dispari	$\mathrm{e}^{-ax}H(x) - \mathrm{e}^{ax}H(-x) \quad (a > 0)$	$-\dfrac{2\mathbf{i}k}{a^2 + k^2}$
onda quadra	$c\left[H(x + a) - H(x - a)\right]$	$2ac\dfrac{\sin ak}{ak}$
delta di Dirac	$\delta(x)$	1
Gaussiana	e^{-x^2}	$\sqrt{\pi}\mathrm{e}^{-\frac{k^2}{4}}$

Proprietà della trasformata di Fourier

1. $\mathcal{F}\left\{\alpha f + \beta g\right\} = \alpha\mathcal{F}\left\{f\right\} + \beta\mathcal{F}\left\{g\right\}$

2. $\mathcal{F}\left\{f(x - x_0)\right\} = \mathrm{e}^{-\mathbf{i}x_0 k}F(k)$

3. $\mathcal{F}\left\{\mathrm{e}^{\mathbf{i}k_0 x}f(x)\right\} = F(k - k_0)$

4. $\mathcal{F}\left\{f(ax)\right\} = \frac{1}{|a|}F\left(\frac{k}{a}\right)$

5. $\mathcal{F}\left\{g\right\} = f \implies \mathcal{F}\left\{f\right\} = 2\pi g(-k)$

6. $\mathcal{F}\left\{f(x)\cos k_0 x\right\} = \frac{1}{2}\left[F(k - k_0) + F(k + k_0)\right]$

7. $\mathcal{F}\left\{f(x)\sin k_0 x\right\} = \frac{1}{2\mathbf{i}}\left[F(k - k_0) - F(k + k_0)\right]$

8. $\mathcal{F}\left\{f'\right\} = \mathbf{i}kF(k), \qquad \mathcal{F}\left\{f^{(n)}\right\} = (\mathbf{i}k)^n F(k)$

9. $\mathcal{F}\left\{xf(x)\right\} = \mathbf{i}F'(k), \qquad \mathcal{F}\left\{x^n f(x)\right\} = \mathbf{i}^n F^{(n)}(k)$

10. $\mathcal{F}\left\{f * g\right\} = F(k)G(k), \qquad \mathcal{F}^{-1}\left\{F(k)G(k)\right\} = f * g$