Fourier Transformationen

Nr.	Originalfunktion $f(t)$	Bildfunktion $F(y)$
1	$\frac{a}{a^2 + t^2}$, $\operatorname{Re} a > 0$	$\pi\, e^{-a\lvert y\rvert}$
2	$\frac{1}{(a - jt)^{n+1}}$ $\operatorname{Re} a > 0, \quad n \in \mathbb{N}$	$\begin{cases} 0, & y < 0 \\ \frac{2\pi}{n!}\, y^n\, e^{-ay}, & y > 0 \end{cases}$
3	$\frac{1}{(a + jt)^{n+1}}$ $\operatorname{Re} a > 0, n \in \mathbb{N}$	$\begin{cases} (-1)^{n+1}\, \frac{2\pi}{n!}\, y^n e^{ay}, & y < 0 \\ 0, & y > 0 \end{cases}$
4	$\frac{ab(a^2 - b^2)}{(a^2 + t^2)\,(b^2 + t^2)}$ $\operatorname{Re} a > 0, \quad \operatorname{Re} b > 0$	$\pi(a e^{-by} - b e^{-ay})$
5	$\frac{a^3}{a^4 + t^4}$, $\lvert\arg a\rvert < \frac{\pi}{4}$	$\pi\, e^{-ay/\sqrt{2}} \sin\left(\frac{\pi}{4} + \frac{ay}{\sqrt{2}}\right)$
6	$\begin{cases} 0, & t < -a, \quad a < t \\ \frac{1}{\sqrt{a^2 - t^2}}, & -a < t < a \end{cases}$	$\pi J_0(ay), \quad a > 0$
7	e^{-at^2}, $\operatorname{Re} a > 0$	$\frac{\sqrt{\pi}}{\sqrt{a}}\, e^{-y^2/4a}$
8	$\frac{\sin at}{t}$, $a > 0$	$\begin{cases} 0, & y < -a, a < y \\ \pi, & -a < y < a \end{cases}$

Nr.	Gerade Originalfunktion $f(t)$: $f(-t) = f(t), \quad t > 0$	Gerade Bildfunktion $F(y)$: $F(-y) = F(y), \quad y > 0$
9	$\begin{cases} 1, & 0 \leqq t < a \\ 0, & a < t \end{cases}$	$\dfrac{2 \sin ay}{y}$
10	$\begin{cases} t, & 0 \leqq t \leqq 1 \\ 2 - t, & 1 \leqq t \leqq 2 \\ 0, & 2 \leqq t \end{cases}$	$\dfrac{2}{y^2}(2 \cos y - 1 - \cos 2y)$
11	$\dfrac{1}{\sqrt{t}}$	$\dfrac{\sqrt{2\pi}}{\sqrt{y}}$
12	$\begin{cases} 0, & 0 \leqq t < a \\ \dfrac{1}{\sqrt{t-a}}, & a < t \end{cases}$	$\dfrac{\sqrt{2\pi}}{\sqrt{y}}(\cos ay - \sin ay)$
13	$\dfrac{e^{-bt} - e^{-at}}{t}$ $\operatorname{Re} a > 0, \quad \operatorname{Re} b > 0$	$\ln \dfrac{a^2 + y^2}{b^2 + y^2}$
14	$\dfrac{e^{-at}}{\sqrt{t}}, \quad \operatorname{Re} a > 0$	$\dfrac{\sqrt{2\pi}(\sqrt{a^2 + y^2} + a)^{1/2}}{\sqrt{a^2 + y^2}}$
15	$e^{-bt} \sin at$ $a > 0, \quad \operatorname{Re} b > 0$	$\dfrac{a + y}{b^2 + (a + y)^2} + \dfrac{a - y}{b^2 + (a - y)^2}$
16	$e^{-bt} \cos at$ $\operatorname{Re} b > \lvert \operatorname{Im} a \rvert$	$\dfrac{b}{b^2 + (a + y)^2} + \dfrac{b}{b^2 + (a - y)^2}$
17	$\dfrac{\ln t}{\sqrt{t}}$	$-\dfrac{\sqrt{2\pi}}{\sqrt{y}}\left(\ln 4y + C + \dfrac{\pi}{2}\right)$
18	$\begin{cases} \ln t, & 0 < t \leqq 1 \\ 0, & 1 \leqq t \end{cases}$	$-\dfrac{2}{y}\displaystyle\int_0^y \dfrac{\sin t}{t}\,dt$
19	$\dfrac{\sin^2 at}{t^2}, \quad a > 0$	$\begin{cases} \pi\left(a - \dfrac{y}{2}\right), & y \leqq 2a \\ 0, & 2a \leqq y \end{cases}$
20	$\dfrac{1 - \cos at}{t^2}, \quad a > 0$	$\begin{cases} \pi(a - y), & y \leqq a \\ 0, & a \leqq y \end{cases}$

Nr.	Ungerade Originalfunktion $f(t)$: $f(-t) = -f(t), \quad t > 0$	Ungerade Bildfunktion $F(y)$: $F(-y) = -F(y), \quad y > 0$
21	$\begin{cases} 1, & 0 < t < a \\ 0, & a < t \end{cases}$	$\frac{2\mathrm{j}(\cos ay - 1)}{y}$
22	$\begin{cases} t, & 0 \leqq t \leqq 1 \\ 2 - t, & 1 \leqq t \leqq 2 \\ 0, & 2 \leqq t \end{cases}$	$\frac{2\mathrm{j}}{y^2}(\sin 2y - 2 \sin y)$
23	$\frac{1}{\sqrt{t}}$	$-\frac{\sqrt{2\pi}\,\mathrm{j}}{\sqrt{y}}$
24	$\begin{cases} 0, & 0 \leqq t < a \\ \frac{1}{\sqrt{t-a}}, & a < t \end{cases}$	$-\frac{\mathrm{j}\sqrt{2\pi}}{\sqrt{y}}(\sin ay + \cos ay)$
25	$\frac{\mathrm{e}^{-at}}{\sqrt{t}}, \quad \mathrm{Re}\, a > 0$	$-\frac{\mathrm{j}\sqrt{2\pi}(\sqrt{a^2+y^2} - a)^{1/2}}{\sqrt{a^2+y^2}}$
26	$\frac{\ln t}{\sqrt{t}}$	$\frac{\mathrm{j}\sqrt{2\pi}}{\sqrt{y}}\left(\ln 4y + C - \frac{\pi}{2}\right)$
27	$\begin{cases} \ln t, & 0 < t \leqq 1 \\ 0, & 1 \leqq t \end{cases}$	$\frac{2\mathrm{j}}{y}\left(C + \ln y + \int_y^\infty \frac{\cos t}{t}\,\mathrm{d}t\right)$
28	$\frac{\sin at}{t}, \quad a > 0$	$-\mathrm{j} \ln \left\lvert \frac{y+a}{y-a} \right\rvert$
29	$\frac{\cos at}{t}, \quad a > 0$	$\begin{cases} 0, & 0 < y < a \\ -\mathrm{j}\pi, & a < y \end{cases}$
30	$\mathrm{e}^{-at^2}, \quad \mathrm{Re}\, a > 0$	$\frac{\sqrt{\pi}}{\sqrt{a}}\mathrm{e}^{-y^2/4a}\,\mathrm{erf}\,\frac{\mathrm{j}y}{2\sqrt{a}}$
31	$J_0(at), \quad a > 0$	$\begin{cases} 0, & 0 < y < a \\ \frac{-2\mathrm{j}}{\sqrt{y^2-a^2}}, & a < y \end{cases}$