Anhang zum Kapitel 2

2.A Tabelle von Fourier-Transformationspaaren

Die Fourier-Transformationspaare sind zum Teil von [6, 47, 69] entnommen. Es gilt jeweils: $0 < (\alpha, \beta, t_0, \omega_0, A) \in \mathbb{R}, n \in \mathbb{N}$.

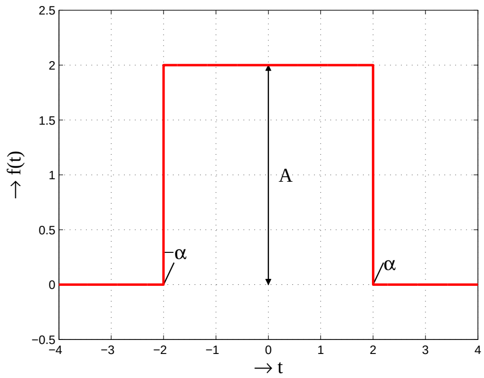
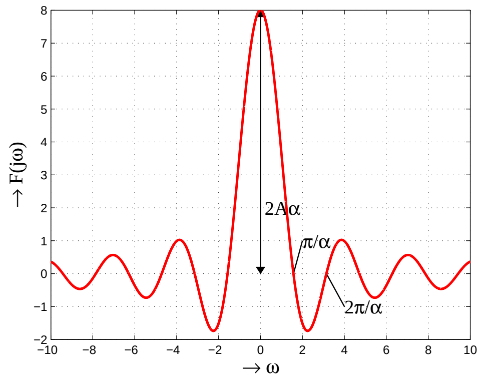
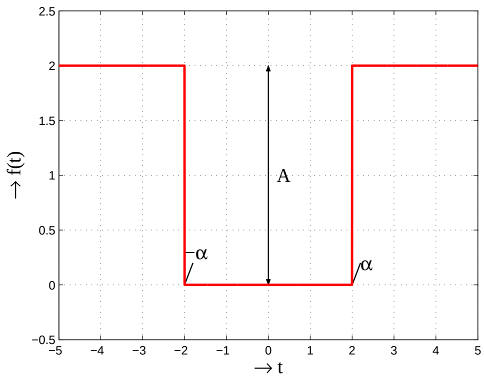
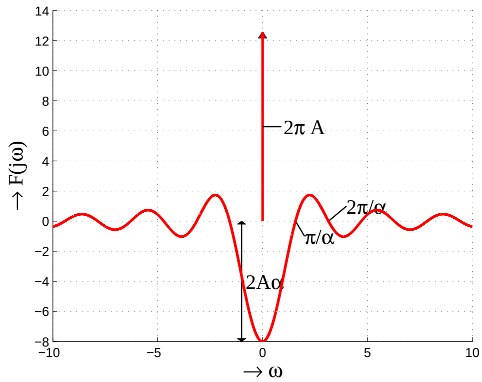
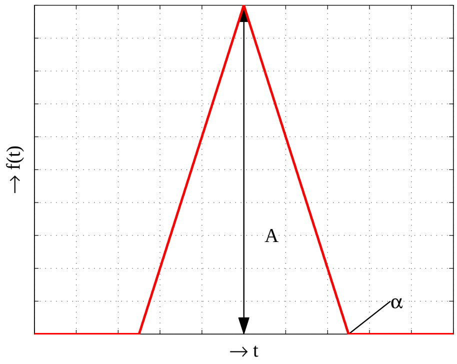
#	Zeitfunktion: $f(t)$	Spektralfunktion: $F(j\omega)$
1	$A \cdot p_\alpha(t) = \begin{cases} A & \text{für } \lvert t\rvert < \alpha, \\ \frac{A}{2} & \text{für } \lvert t\rvert = \alpha, \\ 0 & \text{für } \lvert t\rvert > \alpha. \end{cases}$ 	$\frac{2A}{\omega} \sin(\alpha\omega) = 2A\alpha \cdot sinc(\alpha\omega)$ 
3	$A(1 - p_\alpha(t)) = \begin{cases} 0 & \text{für } \lvert t\rvert < \alpha, \\ \frac{A}{2} & \text{für } \lvert t\rvert = \alpha, \\ A & \text{für } \lvert t\rvert > \alpha. \end{cases}$ 	$2 \cdot \pi \cdot A\delta(\omega) - 2A\alpha \cdot sinc(\alpha\omega)$ 

Tabelle 2.3: Fourier-Transformationspaare

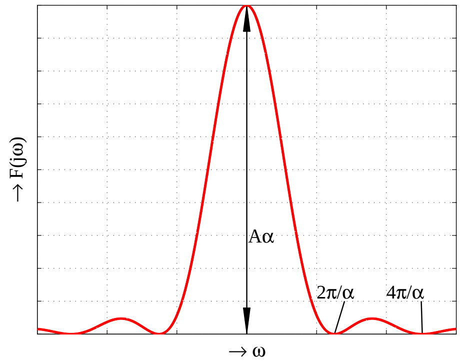
<table>
<tr><th>#</th><th>Zeitfunktion: $f(t)$</th><th>Spektralfunktion: $F(j\omega)$</th></tr>
<tr><td>4</td><td>

$A \cdot \Lambda_\alpha(t) = \begin{cases} A - \frac{A|t|}{\alpha} & \text{für } |t| < \alpha, \\ 0 & \text{für } |t| \geq 0. \end{cases}$



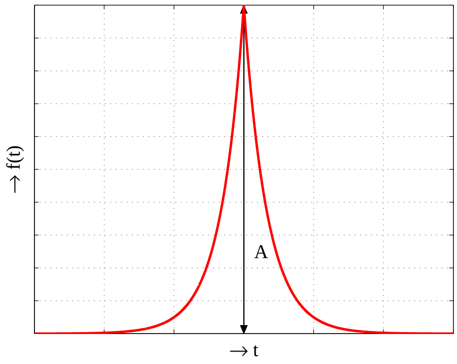
</td><td>

$A\alpha \cdot \left(\frac{\sin\left(\frac{\alpha\omega}{2}\right)}{\frac{\alpha\omega}{2}}\right)^2 = A\alpha \cdot \left(sinc\left(\frac{\alpha\omega}{2}\right)\right)^2$



</td></tr>
<tr><td>5</td><td>

$Ae^{-\alpha|t|}$



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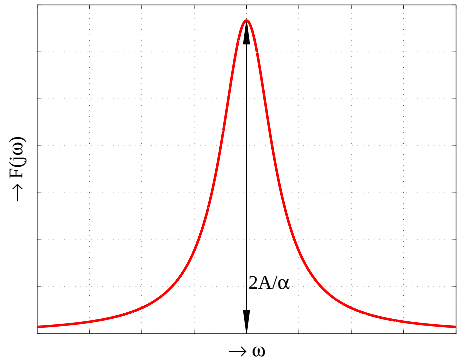
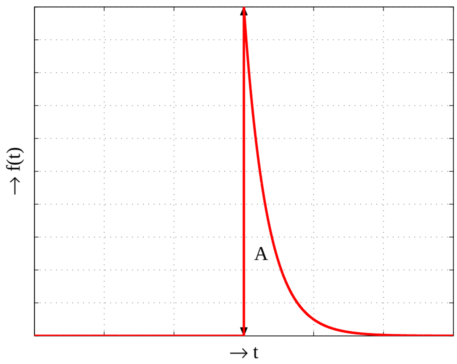
$\frac{2\alpha A}{\alpha^2+\omega^2}$



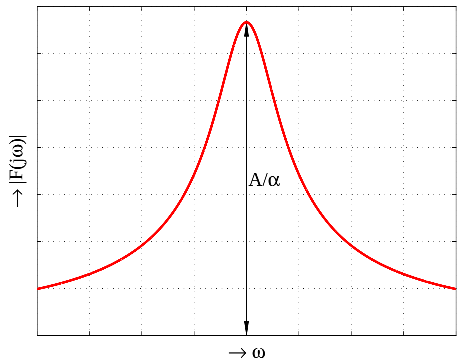
</td></tr>
<tr><td>6</td><td>

$Ae^{-\alpha t}u(t)$



</td><td>

$A\frac{\alpha - j\omega}{\alpha^2+\omega^2} = \frac{A}{\alpha+j\omega}$



</td></tr>
</table>

Tabelle 2.4: Fourier-Transformationspaare

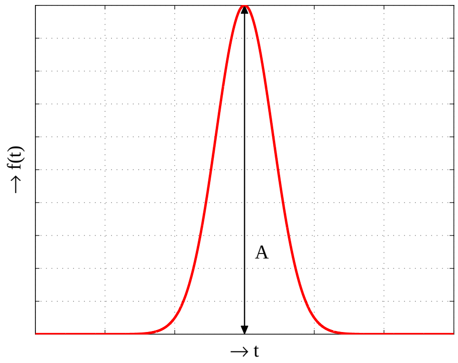
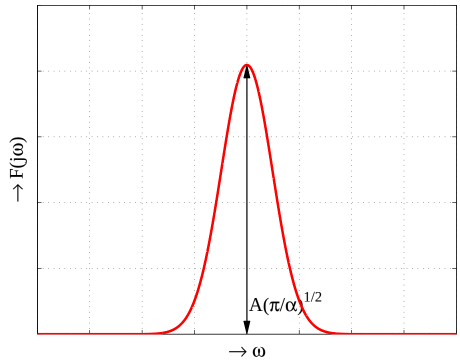
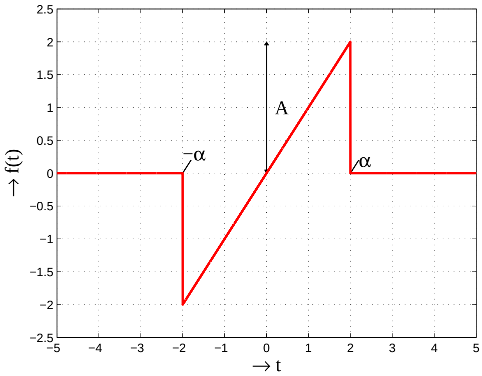
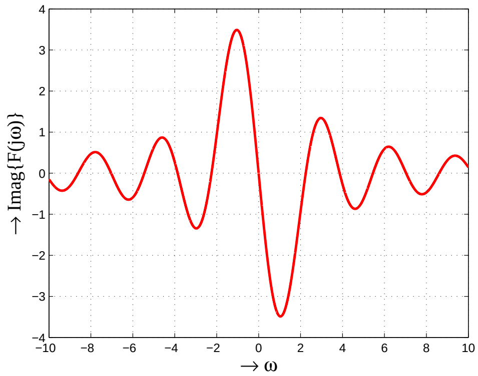
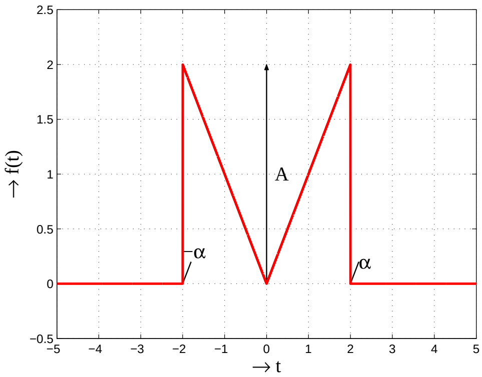
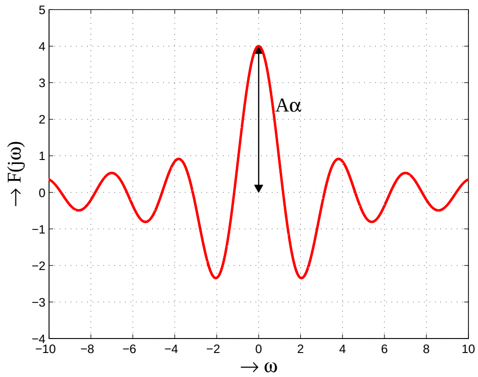
#	Zeitfunktion: $f(t)$	Spektralfunktion: $F(j\omega)$
7	$Ae^{-\alpha t^2}$  	$A\sqrt{\frac{\pi}{\alpha}}e^{\frac{-\omega^2}{4\alpha}}$ 
8	$e^{-\alpha t^2+\beta t}$	$\sqrt{\frac{\pi}{\alpha}}e^{\frac{\beta^2-j2\alpha\beta\omega-\omega^2}{4\alpha}}$
9	$e^{\pm j\alpha t^2}$	$\sqrt{\frac{\pi}{\alpha}}e^{\mp j\frac{\omega^2-\alpha\pi}{4\alpha}}$
10	$\frac{1}{t}\sin(\alpha t) = sinc_\alpha(t)$	$\pi \cdot p_\alpha(\omega)$
11	$sinc(\alpha t)$	$\frac{\pi}{\alpha} \cdot p_\alpha(\omega)$
12	$\frac{A\cdot t}{\alpha} \cdot p_\alpha(t)$  	$j\frac{2A}{\omega}\left(\cos(\omega\alpha) - \frac{\sin(\omega\alpha)}{\omega\alpha}\right)$ 
13	$\frac{A\cdot\lvert t\rvert}{\alpha} \cdot p_\alpha(t)$  	$2A\alpha\left(\frac{\sin(\omega\alpha)}{\omega\alpha} - 2\left(\frac{\sin\left(\frac{\omega\alpha}{2}\right)}{\omega\alpha}\right)^2\right)$ 

Tabelle 2.5: Fourier-Transformationspaare

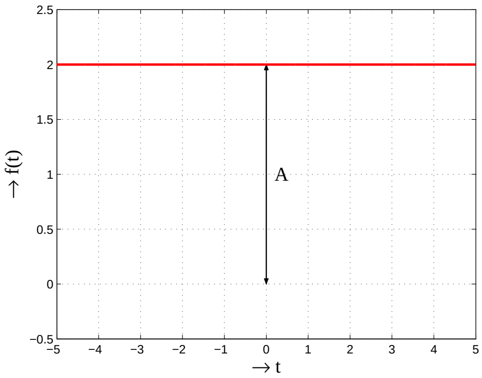
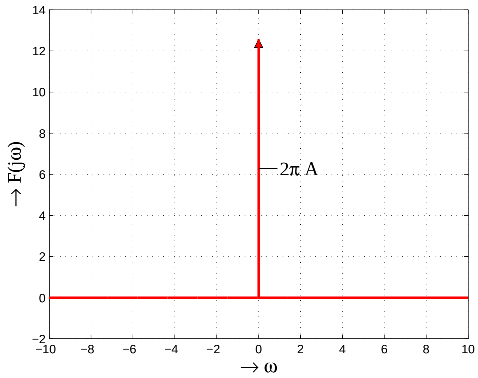
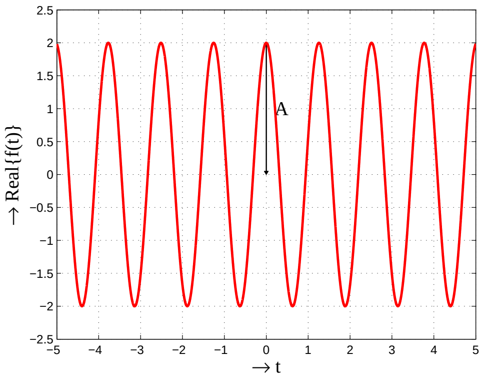
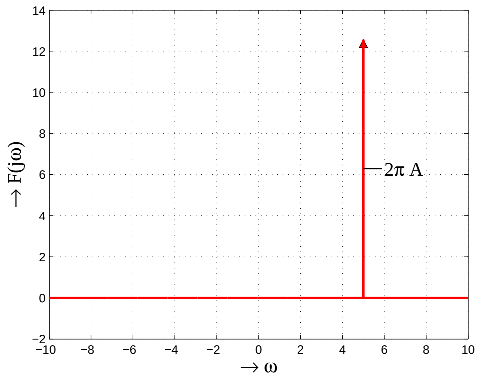
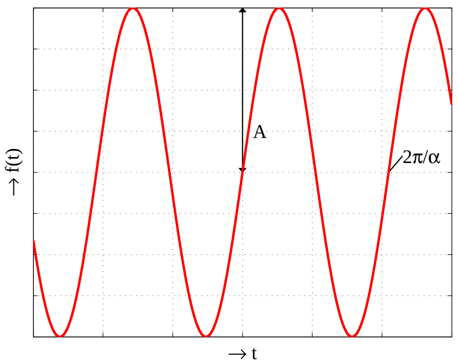
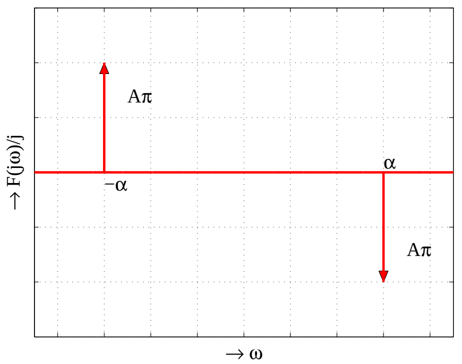
#	Zeitfunktion: $f(t)$	Spektralfunktion: $F(j\omega)$
14	$\left(\frac{1}{t}\sin(\alpha t)\right)^2 = (sinc_\alpha(t))^2$	$\frac{\pi}{2}\cdot(2\alpha-\lvert\omega\rvert)\cdot p_{2\alpha}(\omega) = \pi\alpha\cdot\Lambda_{2\alpha}(\omega)$
15	$\frac{1}{\lvert t\rvert}\sin(\alpha t)$	$-j\cdot sgn(\omega)\ln\left\lvert\frac{\lvert\omega\rvert+\alpha}{\lvert\omega\rvert-\alpha}\right\rvert$
16	A 	$2\pi\cdot A\cdot\delta(\omega)$ 
17	$A\cdot e^{j\omega_0 t}$ 	$2\pi A\cdot\delta(\omega-\omega_0)$ 
18	$\delta(t-\beta)$	$e^{-j\beta\omega}$
19	$A\sin(\alpha t)$ 	$jA\pi[\delta(\omega+\alpha)-\delta(\omega-\alpha)]$ 

Tabelle 2.6: Fourier-Transformationspaare

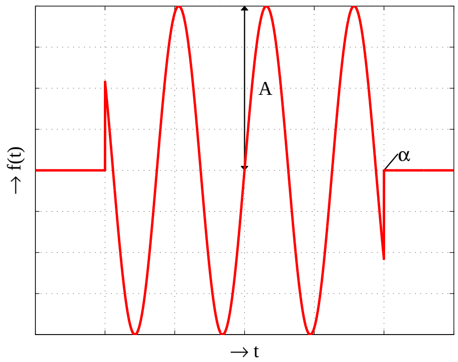
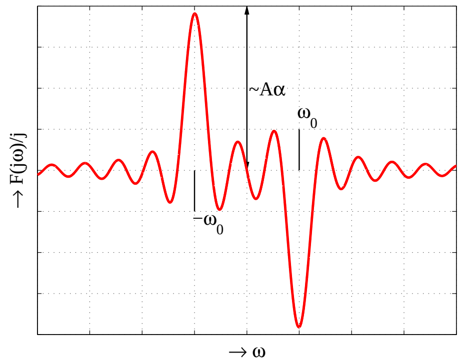
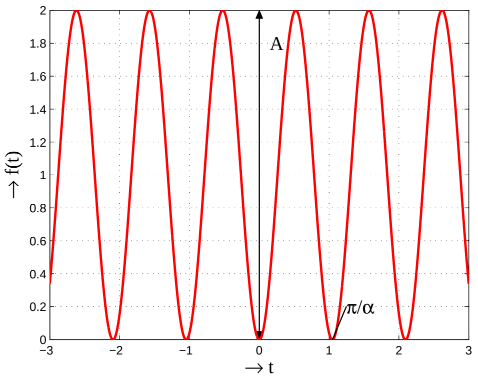
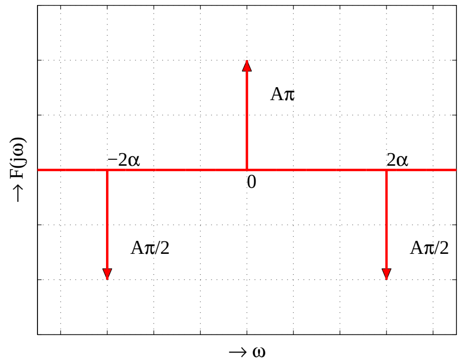
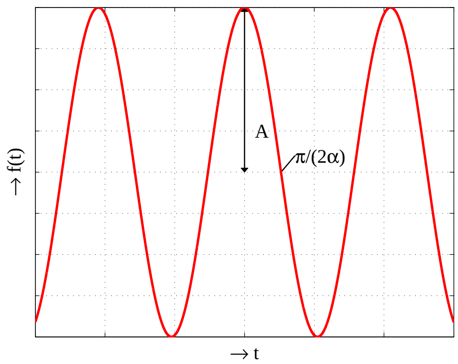
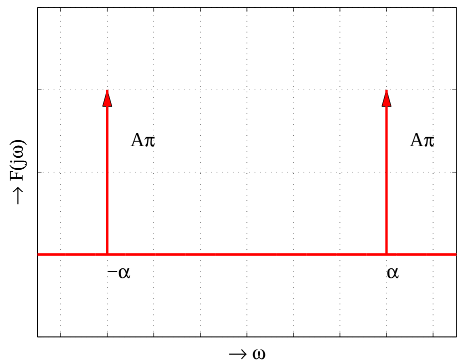
#	**Zeitfunktion: $f(t)$**	**Spektralfunktion: $F(j\omega)$**
20	$A\sin(\omega_0 t)p_\alpha(t)$ 	$jA\left(\frac{\sin(\alpha(\omega+\omega_0))}{\omega+\omega_0} - \frac{\sin(\alpha(\omega-\omega_0))}{\omega-\omega_0}\right)$ 
21	$A\left(\sin(\alpha t)\right)^2$ 	$\frac{A\pi}{2}[-\delta(\omega+2\alpha)+2\delta(\omega)-\delta(\omega-2\alpha)]$ 
22	$A\cos(\alpha t)$ 	$A\pi[\delta(\omega+\alpha)+\delta(\omega-\alpha)]$ 
23	$A\cdot\sin(\omega_0 t)e^{-at}u(t)$	$\frac{A\omega_0}{a^2+\omega_0^2-\omega^2+j2a\omega} = \frac{A\omega_0}{(a+j\omega)^2+\omega_0^2}$
24	$A\cdot\cos(\omega_0 t)e^{-at}u(t)$	$\frac{A(a+j\omega)}{(a+j\omega)^2+\omega_0^2}$

Tabelle 2.7: Fourier-Transformationspaare

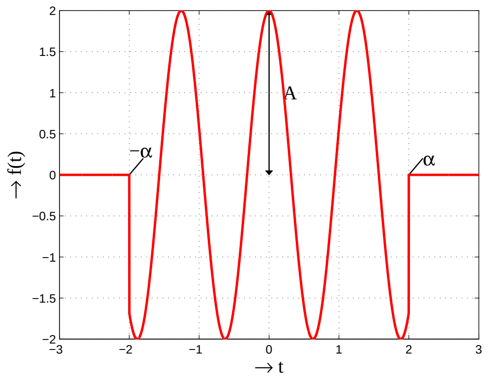
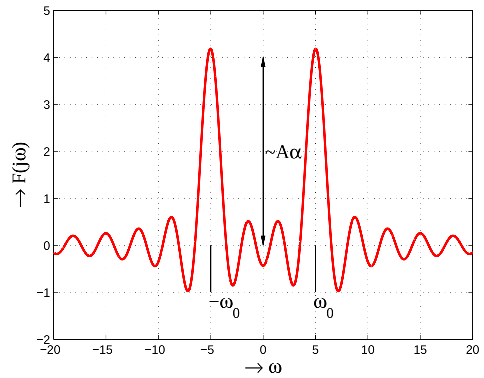
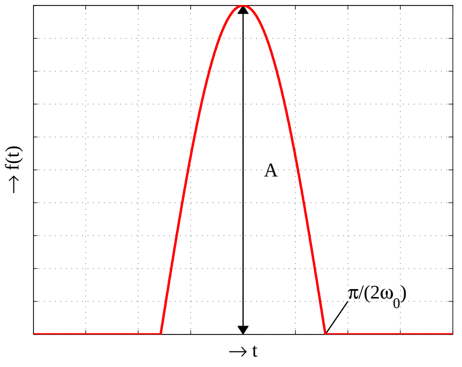
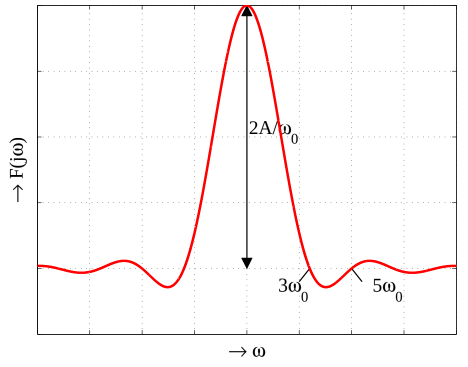
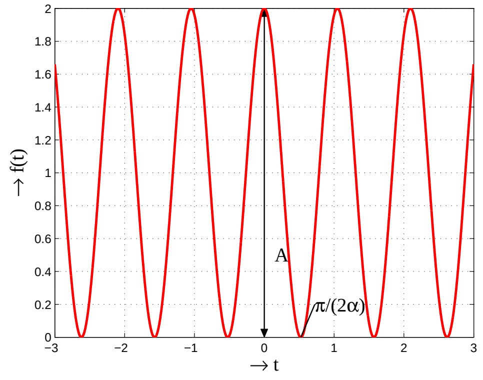
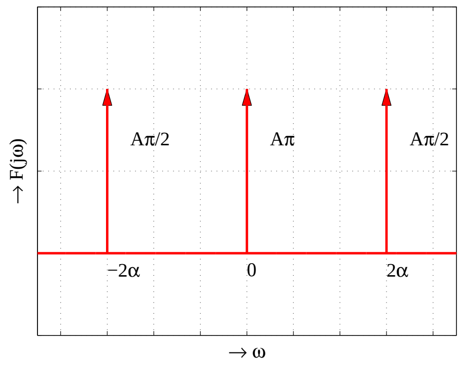
<table>
<tr><th>#</th><th>Zeitfunktion: $f(t)$</th><th>Spektralfunktion: $F(j\omega)$</th></tr>
<tr><td>25</td><td>$A\cos(\omega_0 t)p_\alpha(t)$
</td><td>$A\left(\frac{\sin(\alpha(\omega+\omega_0))}{\omega+\omega_0}+\frac{\sin(\alpha(\omega-\omega_0))}{\omega-\omega_0}\right)$
</td></tr>
<tr><td>26</td><td>$A\cos(\omega_0 t)p_{\frac{\pi}{2\omega_0}}(t)$
</td><td>$A\frac{2\omega_0}{\omega_0^2-\omega^2}\cos\left(\frac{\pi\omega}{2\omega_0}\right)$
</td></tr>
<tr><td>27</td><td>$A\left(\cos(\alpha t)\right)^2$
</td><td>$\frac{A\pi}{2}[\delta(\omega+2\alpha)+2\delta(\omega)+\delta(\omega-2\alpha)]$
</td></tr>
<tr><td>28</td><td>$\sin(\alpha t^2)$</td><td>$-\sqrt{\frac{\pi}{\alpha}}\sin\left(\frac{\omega^2-\alpha\pi}{4\alpha}\right)$</td></tr>
<tr><td>29</td><td>$\cos(\alpha t^2)$</td><td>$\sqrt{\frac{\pi}{\alpha}}\cos\left(\frac{\omega^2-\alpha\pi}{4\alpha}\right)$</td></tr>
</table>

Tabelle 2.8: Fourier-Transformationspaare

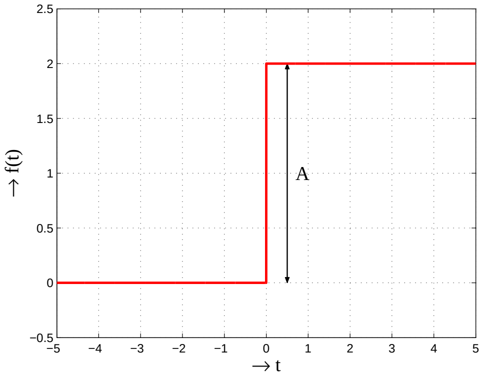
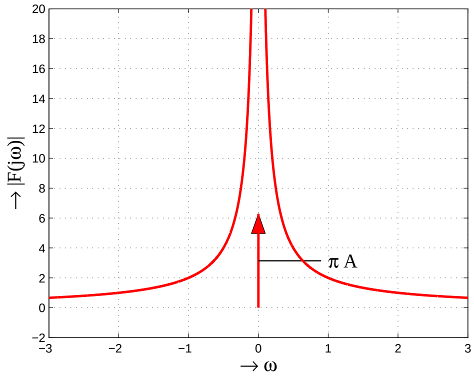
#	Zeitfunktion: $\boldsymbol{f(t)}$	Spektralfunktion: $\boldsymbol{F(j\omega)}$
30	$A \cdot u(t)$ 	$A \cdot \left(\pi \cdot \delta(\omega) - j\frac{1}{\omega}\right)$ 
31	$\frac{1}{t}$	$j\pi sgn(\omega)$
32	t^{-n}	$-j\pi\frac{(-j\omega)^{n-1}}{(n-1)!}sgn(\omega)$
33	$\|t\|$	$-\frac{2}{\omega^2}$
34	$r(t) = t \cdot u(t)$	$j\pi\frac{d\delta(\omega)}{dt} - \frac{1}{\omega^2}$
35	$A \cdot sgn(t)$	$\frac{-2jA}{\omega}$
36	$t^{-n}sgn(t)$	$(-j)^{n+1}\frac{2 \cdot n!}{\omega^{n+1}}$
37	$\sqrt{\|t\|}$	$-\sqrt{\frac{2\pi}{\|\omega\|}}$
38	$A \cdot \sum\limits_{n=-\infty}^{\infty} \delta(t - n \cdot t_0)$	$\frac{2\pi A}{t_0} \cdot \sum\limits_{n=-\infty}^{\infty} \delta(\omega - n \cdot \frac{2\pi}{t_0})$
39	$A \cdot \sum\limits_{n=-\infty}^{\infty} \delta(t - n \cdot t_0 - \frac{t_0}{2})$	$\frac{2\pi A}{t_0} \cdot \sum\limits_{n=-\infty}^{\infty} (-1)^n\delta(\omega - n \cdot \frac{2\pi}{t_0})$
40	$A \cdot \sum\limits_{n=0}^{N-1} \delta(t - n \cdot t_0 - \beta + \frac{(N-1)t_0}{2})$	$Ae^{j\beta\omega}\frac{\sin(N\omega t_o/2)}{\sin(\omega t_0/2)}$
41	$\sum\limits_{n=-\infty}^{\infty} \delta(t - n \cdot t_0)\left(A + \alpha\cos(\omega_0 t)\right)$	$\frac{2\pi}{t_0} \cdot \sum\limits_{n=-\infty}^{\infty}\left(A\delta(\omega - n\frac{2\pi}{t_0}) + \frac{\alpha}{2}\left(\delta(\omega - n\frac{2\pi}{t_0} + \omega_0) + \delta(\omega - n\frac{2\pi}{t_0} - \omega_0)\right)\right)$
42	$\sum\limits_{n=-\infty}^{\infty} \delta(t - n \cdot t_0)\left(A + \alpha\sin(\omega_0 t)\right)$	$\frac{2\pi}{t_0} \cdot \sum\limits_{n=-\infty}^{\infty}\left(A\delta(\omega - n\frac{2\pi}{t_0}) + \frac{j\alpha}{2}\left(\delta(\omega - n\frac{2\pi}{t_0} + \omega_0) - \delta(\omega - n\frac{2\pi}{t_0} - \omega_0)\right)\right)$
43	$A\delta(t)$	A
44	$A\delta(t - t_0)$	$Ae^{-jt_0\omega}$
45	$A\left(\delta(t + t_0) + \delta(t - t_0)\right)$	$2A\cos(\omega t_0)$
46	$e^{j\beta t}\left(A + \alpha\cos(\omega_0 t)\right)$	$2\pi\left(A\delta(\omega-\beta) + \frac{\alpha}{2}(\delta(\omega-\beta+\omega_0) + \delta(\omega-\beta-\omega_0))\right)$
47	$e^{j\beta t}\left(A + \alpha\sin(\omega_0 t)\right)$	$2\pi\left(A\delta(\omega-\beta) + \frac{j\alpha}{2}(\delta(\omega-\beta+\omega_0) - \delta(\omega-\beta-\omega_0))\right)$
48	$A\left(1 - e^{-at}\right)u(t)$	$\pi A\delta(\omega) - A\left(\frac{a}{a^2+\omega^2} + \frac{ja^2}{\omega(a^2+\omega^2)}\right)$
49	$sgn(t) \cdot A \cdot e^{-a\|t\|}$	$-2jA\frac{\omega}{\omega^2+a^2}$
50	$A \cdot e^{j\omega_0 t - a\|t\|}$	$\frac{2A}{a} \cdot \frac{a^2}{(\omega-\omega_0)^2+a^2}$
51	$A \cdot \cos(\omega_0 t)e^{-a\|t\|}$	$\frac{A}{a} \cdot \frac{2a^2(a^2+\omega_0^2+\omega^2)}{(a^2+\omega_0^2-\omega^2)^2+4a^2\omega^2}$
52	$A \cdot p_\alpha(t - \beta)$	$2Ae^{-j\beta\omega}\frac{\sin(\alpha\omega)}{\omega} = \frac{jA}{\omega}\left(e^{-j\omega(\beta+\alpha)} - e^{-j\omega(\beta-\alpha)}\right)$
53	$A \cdot e^{j\omega_0 t}p_\alpha(t)$	$2A\frac{\sin(\alpha(\omega_0-\omega))}{\omega_0-\omega}$
54	$A \cdot \left(p_\alpha(t - \beta) + p_\alpha(t + \beta)\right)$	$2A\frac{\cos(\beta\omega)\sin(\alpha\omega)}{\omega}$

Tabelle 2.9: Fourier-Transformationspaare

2.B Tabelle von Laplace-Transformationspaaren

Die Transformationspaare sind mehrheitlich [6, 7, 21, 47, 69] entnommen. Es gilt: $0 < \alpha \in \mathbb{R}, n \in \mathbb{N}$, $a,\ \nu \in \mathbb{C}$, $s = \sigma + j\omega$ und somit $\Re\{s\} = \sigma$ und $\Im\{s\} = \omega$.

#	$\boldsymbol{f(t)}$, wobei $f(t) = 0$ für $t < 0$	$\boldsymbol{F(s)}$ mit **Konvergenzbereich**
1	$\frac{d^n f(t)}{dt^n}$	$s^n F(s) - s^{n-1} f(0) - s^{n-2} \frac{df(0)}{dt} - \ldots - \frac{d^{n-1} f(0)}{d^{n-1} t}$
2	$\int\limits_0^t f(x) dx$	$\frac{F(s)}{s}$
3	$\frac{f(t)}{t}$	$\int\limits_0^\infty F(s) ds$
4	$f(t-\alpha) u(t-\alpha)$	$e^{-s\alpha} F(s)$
5	$f(t+\alpha) u(t+\alpha)$	$e^{+s\alpha} \left(F(s) - \int\limits_0^a e^{-st} f(t) dt \right)$
6	$f_1(t) * f_2(t) * f_3(t)$	$F_1(s) \cdot F_2(s) \cdot F_3(s)$
7	$f_1(t) \cdot f_2(t)$	$\frac{1}{2\pi j} (F_1(s) * F_2(s))$
8	$\lim\limits_{t \to 0^+} f(t)$	$\lim\limits_{s \to \infty} sF(s)$
9	$\lim\limits_{t \to \infty} f(t)$	$\lim\limits_{s \to 0} sF(s)$
10	$u(t)$	$\frac{1}{s}$ mit $\sigma > 0$
11	$\delta(t)$	1 mit $\sigma \in \mathbb{R}$
12	$\frac{d\delta(t)}{dt}$	s
13	$\frac{t^{n-1}}{(n-1)!}$	$\frac{1}{s^n}$
14	$\frac{t^{n-1} e^{-at}}{(n-1)!}$	$\frac{1}{(s-a)^n}$
15	$\frac{1}{\sqrt{\pi t}}$	$\frac{1}{\sqrt{s}}$
16	$\frac{n! 4^n t^{n-\frac{1}{2}}}{(2n)! \sqrt{\pi}}$	$\frac{1}{s^n \sqrt{s}}$
17	$J_\nu(at)$ mit $\Re\{\nu\} > -1$	$\frac{\left(\sqrt{s^2+a^2}-s\right)^\nu}{a^\nu \sqrt{s^2+a^2}}$ mit $\sigma > \lvert\Im\{a\}\rvert$
18	$I_\nu(at)$ mit $\Re\{\nu\} > -1$	$\frac{\left(s-\sqrt{s^2-a^2}\right)^\nu}{a^\nu \sqrt{s^2-a^2}}$ mit $\sigma > \lvert\Re\{a\}\rvert$
19	$\frac{\sin(\alpha t)}{t}$	$\underbrace{\arctan}_{\tan^{-1}} \left(\frac{\alpha}{s}\right)$ mit $\sigma > 0$

Tabelle 2.10: Laplace-Transformationspaare

$J_\nu(at)$ ist die **Bessel-** oder **Zylinderfunktion $\boldsymbol{\nu}$. Ordnung 1. Gattung** und $I_\nu(at)$ ist die **modifizierte Bessel-Funktion $\boldsymbol{\nu}$. Ordnung** [7].
Die folgende Tabelle ist nach dem Grad des Nenners geordnet. Die Tabelle ist bis zum Nennergrad 3 vollständig und stammt von [6, 21].

$\boldsymbol{F(s)}$,	**Konvergenzbereich**	$\boldsymbol{f(t)}$, wobei $\boldsymbol{f(t)=0}$ für $t<0$ mit $(\alpha,\beta,\gamma)\in\mathbb{C}$.
$1,$	$\sigma\in\mathbb{R}$	$\delta(t)$
$\frac{1}{s},$	$\sigma>0$	$1\ (\equiv u(t))$
$\frac{1}{s+\alpha},$	$\sigma>-\Re\{\alpha\}$	$e^{-\alpha t}$
$\frac{1}{s^2},$	$\sigma>0$	t
$\frac{1}{s(s+\alpha)},$	$\sigma>-\min\{\Re\{\alpha\},0\}$	$\frac{1-e^{-\alpha t}}{\alpha}$
$\frac{1}{(s+\alpha)(s+\beta)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}\}$	$\frac{e^{-\alpha t}-e^{-\beta t}}{\beta-\alpha}$
$\frac{s}{(s+\alpha)(s+\beta)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}\}$	$\frac{\alpha e^{-\alpha t}-\beta e^{-\beta t}}{\alpha-\beta}$
$\frac{1}{(s+\alpha)^2},$	$\sigma>-\Re\{\alpha\}$	$te^{-\alpha t}$
$\frac{s}{(s+\alpha)^2},$	$\sigma>-\Re\{\alpha\}$	$e^{-\alpha t}(1-\alpha t)$
$\frac{1}{s^2-\alpha^2},$	$\sigma>\lvert\Re\{\alpha\}\rvert$	$\frac{\sinh(\alpha t)}{\alpha}$
$\frac{s}{s^2-\alpha^2},$	$\sigma>\lvert\Re\{\alpha\}\rvert$	$\cosh(\alpha t)$
$\frac{1}{s^2+\alpha^2},$	$\sigma>\lvert\Im\{\alpha\}\rvert$	$\frac{\sin(\alpha t)}{\alpha}$
$\frac{s}{s^2+\alpha^2},$	$\sigma>\lvert\Im\{\alpha\}\rvert$	$\cos(\alpha t)$
$\frac{1}{(s+\beta)^2+\alpha^2},$	$\sigma>\lvert\Im\{\alpha\}\rvert-\Re\{\beta\}$	$\frac{e^{-\beta t}\sin(\alpha t)}{\alpha}$
$\frac{s}{(s+\beta)^2+\alpha^2},$	$\sigma>\lvert\Im\{\alpha\}\rvert-\Re\{\beta\}$	$\frac{e^{-\beta t}(\alpha\cos(\alpha t)-\beta\sin(\alpha t))}{\alpha}$
$\frac{1}{s^3},$	$\sigma>0$	$\frac{t^2}{2}$
$\frac{1}{s^2(s+\alpha)},$	$\sigma>-\min\{\Re\{\alpha\},0\}$	$\frac{e^{-\alpha t}+\alpha t-1}{\alpha^2}$
$\frac{1}{s(s+\alpha)(s+\beta)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\},0\}$	$\frac{(\alpha-\beta)+\beta e^{-\alpha t}-\alpha e^{-\beta t}}{\alpha\beta(\alpha-\beta)}$
$\frac{1}{s(s+\alpha)^2},$	$\sigma>-\min\{\Re\{\alpha\},0\}$	$\frac{1-e^{-\alpha t}-\alpha te^{-\alpha t}}{\alpha^2}$
$\frac{1}{(s+\alpha)(s+\beta)(s+\gamma)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\},\Re\{\gamma\}\}$	$\frac{(\gamma-\beta)e^{-\alpha t}+(\alpha-\gamma)e^{-\beta t}+(\beta-\alpha)e^{-\gamma t}}{(\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)}$
$\frac{s}{(s+\alpha)(s+\beta)(s+\gamma)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\},\Re\{\gamma\}\}$	$\frac{\alpha(\beta-\gamma)e^{-\alpha t}+\beta(\gamma-\alpha)e^{-\beta t}+\gamma(\alpha-\beta)e^{-\gamma t}}{(\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)}$
$\frac{s^2}{(s+\alpha)(s+\beta)(s+\gamma)},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\},\Re\{\gamma\}\}$	$\frac{-\alpha^2(\beta-\gamma)e^{-\alpha t}-\beta^2(\gamma-\alpha)e^{-\beta t}-\gamma^2(\alpha-\beta)e^{-\gamma t}}{(\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)}$
$\frac{1}{(s+\alpha)(s+\beta)^2},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}\}$	$\frac{e^{-\alpha t}-[1+(\beta-\alpha)t]e^{-\beta t}}{(\beta-\alpha)^2}$
$\frac{s}{(s+\alpha)(s+\beta)^2},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}\}$	$\frac{-\alpha e^{-\alpha t}+[\alpha+t\beta(\beta-\alpha)]e^{-\beta t}}{(\beta-\alpha)^2}$
$\frac{s^2}{(s+\alpha)(s+\beta)^2},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}\}$	$\frac{\alpha^2e^{-\alpha t}+\beta(\beta-2\alpha-t\beta^2+\alpha\beta t)e^{-\beta t}}{(\beta-\alpha)^2}$
$\frac{1}{(s+\alpha)^3},$	$\sigma>-\Re\{\alpha\}$	$\frac{t^2e^{-\alpha t}}{2}$
$\frac{s}{(s+\alpha)^3},$	$\sigma>-\Re\{\alpha\}$	$\frac{(2-\alpha t)te^{-\alpha t}}{2}$
$\frac{s^2}{(s+\alpha)^3},$	$\sigma>-\Re\{\alpha\}$	$\frac{(2-4\alpha t+\alpha^2t^2)e^{-\alpha t}}{2}$
$\frac{1}{s[(s+\beta)^2+\alpha^2]},$	$\sigma>-\min\{\Re\{\beta\}-\lvert\Im\{\alpha\}\rvert,0\}$	$\frac{\alpha-e^{-\beta t}[\alpha\cos(\alpha t)+\beta\sin(\alpha t)]}{\alpha(\alpha^2+\beta^2)}$
$\frac{1}{s(s^2+\alpha^2)},$	$\sigma>\lvert\Im\{\alpha\}\rvert$	$\frac{1-\cos(\alpha t)}{\alpha^2}$
$\frac{1}{(s+\alpha)(s^2+\beta^2)},$	$\sigma>-\min\{-\lvert\Im\{\beta\}\rvert,\Re\{\alpha\}\}$	$\frac{\beta e^{-\alpha t}+\alpha\sin(\beta t)-\beta\cos(\beta t)}{\beta(\alpha^2+\beta^2)}$
$\frac{s}{(s+\alpha)(s^2+\beta^2)},$	$\sigma>-\min\{-\lvert\Im\{\beta\}\rvert,\Re\{\alpha\}\}$	$\frac{-\alpha e^{-\alpha t}+\alpha\cos(\beta t)+\beta\sin(\beta t)}{\alpha^2+\beta^2}$
$\frac{s^2}{(s+\alpha)(s^2+\beta^2)},$	$\sigma>-\min\{-\lvert\Im\{\beta\}\rvert,\Re\{\alpha\}\}$	$\frac{\alpha^2e^{-\alpha t}-\alpha\beta\sin(\beta t)+\beta^2\cos(\beta t)}{\alpha^2+\beta^2}$
$\frac{1}{(s+\alpha)[(s+\beta)^2+\gamma^2]},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}-\lvert\Im\{\gamma\}\rvert\}$	$\frac{e^{-\alpha t}-e^{-\beta t}\cos(\gamma t)+\frac{\alpha-\beta}{\gamma}e^{-\beta t}\sin(\gamma t)}{(\beta-\alpha)^2+\gamma^2}$
$\frac{s}{(s+\alpha)[(s+\beta)^2+\gamma^2]},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}-\lvert\Im\{\gamma\}\rvert\}$	$\frac{-\alpha e^{-\alpha t}+\alpha e^{-\beta t}\cos(\gamma t)-\frac{\alpha\beta-\beta^2-\gamma^2}{\gamma}e^{-\beta t}\sin(\gamma t)}{(\beta-\alpha)^2+\gamma^2}$
$\frac{s^2}{(s+\alpha)[(s+\beta)^2+\gamma^2]},$	$\sigma>-\min\{\Re\{\alpha\},\Re\{\beta\}-\lvert\Im\{\gamma\}\rvert\}$	$\frac{\alpha^2e^{-\alpha t}+[(\alpha-\beta)^2+\gamma^2-\alpha^2]e^{-\beta t}\cos(\gamma t)-\left(\alpha\gamma+\beta\left(\gamma-\frac{\beta(\alpha-\beta)}{\gamma}\right)\right)e^{-\beta t}\sin(\gamma t)}{(\beta-\alpha)^2+\gamma^2}$
$\frac{1}{s^4},$	$\sigma>0$	$\frac{t^3}{6}$

Tabelle 2.11: Laplace-Transformationspaare