| $u(t) = F^{-1}\{U(j\omega)\}$ | $U(j\omega) = F\{u(t)\}$ | Bemerkung |
|---|---|---|
| $\frac{1}{2\pi} \int_{-\infty}^{\infty} U(j\omega)\, e^{j\omega t}\, d\omega$ | $\int_{-\infty}^{\infty} u(t)\, e^{-j\omega t}\, dt$ | Definition |
| $c_1\, u_1(t) + c_2\, u_2(t)$ | $c_1\, U_1(j\omega) + c_2\, U_2(j\omega)$ | Linearität |
| $u(ct)$ | $\frac{1}{\lvert c \rvert} U\left(\frac{j\omega}{c}\right)$ | zeitliche Dehnung |
| $u(t - T_L)$ | $e^{-j\omega T_L}\, U(j\omega)$ | zeitliche Verschiebung |
| $u_1(t) * u_2(t)$ | $U_1(j\omega)\, U_2(j\omega)$ | Faltung |
| $\dot{u}(t)$ | $j\omega\, U(j\omega)$ | Differentiation |
| $\int_{-\infty}^{t} u(\tau)\, d\tau$ | $U(j\omega)\, F\{\sigma(t)\}$ | Integration<br>$F\{\sigma(t)\}$ in Tabelle 3.2 |
| $u_1(t)\, u_2(t)$ | $\frac{1}{2\pi T^2} U_1(j\omega) * U_2(j\omega)$ | Produkt |
| $u(t)\, e^{j\omega_1 t}$ | $U(j\omega - j\omega_1)$ | Faktor $e^{j\omega_1 t}$ |
| $u(t)\, t^k$ | $(-1)^k \frac{d^k}{d(j\omega)^k} U(j\omega)$ | Faktor $t^k$ |
| $u(0) = \frac{1}{2\pi} \int_{-\infty}^{\infty} U(j\omega)\, d\omega$ | $U(0) = \int_{-\infty}^{\infty} u(t)\, dt$ | Anfangswert |

| $u(t) = L^{-1}\{U(s)\}$ | $U(s) = L\{u(t)\}$ | Bemerkung |
|---|---|---|
| $\frac{1}{2\pi j} \int_{\alpha - j\infty}^{\alpha + j\infty} U(s)\, e^{st}\, ds$ | $\int_{0}^{\infty} u(t)\, e^{-st}\, dt$ | Definition |
| $c_1\, u_1(t) + c_2\, u_2(t)$ | $c_1\, U_1(s) + c_2\, U_2(s)$ | Linearität |
| $u(ct)$ | $\frac{1}{c} U\left(\frac{s}{c}\right)$ | zeitliche Dehnung |
| $u(t - T_L)\, \sigma(t - T_L)$ , $T_L \geq 0$ | $e^{-sT_L}\, U(s)$ | zeitliche Verschiebung |
| $u_1(t) * u_2(t)$ | $U_1(s)\, U_2(s)$ | Faltung |
| $\dot{u}(t)$ | $s\, U(s) - u(+0)$ | Differentiation |
| $\frac{d^k u(t)}{dt^k}$ | $s^k\, U(s) - \sum_{\nu=0}^{k-1} \frac{d^\nu u(+0)}{dt^\nu}\, s^{k-\nu-1}$ | Differentiation, mehrfach |
| $\int_{0}^{t} u(\tau)\, d\tau$ | $\frac{1}{s} U(s)$ | Integration |
| $u(t)\, e^{qt}$ | $U(s - q)$ | Faktor $e^{qt}$ |

| $u(t) = F^{-1}\{U(j\omega)\}$ | $U(j\omega) = F\{u(t)\}$ | Bedingung |
|---|---|---|
| $\mathrm{rect}\, \frac{t}{T}$ | $T\, \mathrm{si}\, \frac{\omega T}{2} = \frac{2}{\omega} \sin \frac{\omega T}{2}$ | $T > 0$ |
| $\mathrm{tri}\, \frac{t}{T}$ | $T\, \mathrm{si}^2\, \frac{\omega T}{2} = \frac{4}{\omega^2 T} \sin^2 \frac{\omega T}{2}$ | $T > 0$ |
| $\mathrm{si}\, \frac{t}{T}$ | $\pi\, T\, \mathrm{rect}\, \frac{\omega T}{2}$ | $T > 0$ |
| $\cos \frac{\pi t}{T}\, \mathrm{rect}\, \frac{t}{T}$ | $\frac{2\pi T}{\pi^2 - \omega^2 T^2} \cos \frac{\omega T}{2}$ | $T > 0$ |
| $\cos^2 \frac{\pi t}{T}\, \mathrm{rect}\, \frac{t}{T}$ | $\frac{2\pi^2 T}{\pi^2 - \omega^2 T^2}\, \mathrm{si}\, \frac{\omega T}{2}$ | $T > 0$ |
| $e^{-qt}\, \sigma(t)$ | $\frac{1}{q + j\omega}$ | $\mathrm{Re}\, q > 0$ |
| $e^{qt}\, \sigma(-t)$ | $\frac{1}{q - j\omega}$ | $\mathrm{Re}\, q > 0$ |
| $t\, e^{-qt}\, \sigma(t)$ | $\frac{1}{(q + j\omega)^2}$ | $\mathrm{Re}\, q > 0$ |
| $t^n\, e^{-qt}\, \sigma(t)$ | $\frac{n!}{(q + j\omega)^{n+1}}$ | $\mathrm{Re}\, q > 0$ |
| $\delta(t)$ | $1$ | |
| $1$ | $2\pi\, \delta(\omega)$ | |
| $e^{j\omega_1 t}$ | $2\pi\, \delta(\omega - \omega_1)$ | |
| $\delta(t - T_L)$ | $e^{-j\omega T_L}$ | |
| $\cos(\omega_1 t)$ | $\pi\, [\, \delta(\omega + \omega_1) + \delta(\omega - \omega_1)\, ]$ | |
| $\sin(\omega_1 t)$ | $\pi\, [\, \delta(\omega + \omega_1) - \delta(\omega - \omega_1)\, ]$ | |
| $\sigma(t)$ | $\pi\, \delta(\omega) + \frac{1}{j\omega}$ | |
| $\cos(\omega_1 t)\, \sigma(t)$ | $\frac{\pi}{2} [\, \delta(\omega + \omega_1) + \delta(\omega - \omega_1)\, ] + \frac{j\omega}{\omega_1^2 - \omega^2}$ | |
| $\sin(\omega_1 t)\, \sigma(t)$ | $\frac{\pi}{2j} [\, -\delta(\omega + \omega_1) + \delta(\omega - \omega_1)\, ] + \frac{\omega_1}{\omega_1^2 - \omega^2}$ | |
| $e^{-qt} \cos(\omega_1 t)\, \sigma(t)$ | $\frac{q + j\omega}{(q + j\omega)^2 + \omega_1^2}$ | $\mathrm{Re}\, q > 0$ |
| $e^{-qt} \sin(\omega_1 t)\, \sigma(t)$ | $\frac{\omega_1}{(q + j\omega)^2 + \omega_1^2}$ | $\mathrm{Re}\, q > 0$ |
| $e^{-\lvert t \rvert / T}$ | $\frac{2\, T}{1 + \omega^2 T^2}$ | $T > 0$ |
| $\mathrm{sgn}\, (t) = \begin{cases} -1 & , \quad t < 0 \\ 0 & , \quad t = 0 \\ 1 & , \quad t > 0 \end{cases}$ | $\frac{2}{j\omega}$ | |
| $\lvert t \rvert = t\, \mathrm{sgn}\, (t)$ | $-\frac{2}{\omega^2}$ | |
| $e^{-t^2/T^2}$ | $\sqrt{\pi}\, T\, e^{-\omega^2 T^2/4}$ | $T > 0$ |
| $\sum_{k=-\infty}^{\infty} c_k\, e^{jk\omega_1 t}$ | $2\pi \sum_{k=-\infty}^{\infty} c_k\, \delta(\omega - k\omega_1)$ | |
| $\sum_{k=-\infty}^{\infty} \delta(t - kT_P)$ | $\omega_1 \sum_{k=-\infty}^{\infty} \delta(\omega - k\omega_1)$ , $\omega_1 = \frac{2\pi}{T_P}$ | |
| $\mathrm{sgn}(t)\, e^{-q\lvert t \rvert}$ | $-\frac{2\, j\omega}{q^2 + \omega^2}$ | $\mathrm{Re}\, q > 0$ |

| $u(t) = L^{-1}\{U(s)\}$ | $U(s) = L\{u(t)\}$ | Bedingung |
|---|---|---|
| $\delta(t)$ | $1$ | |
| $\sigma(t)$ | $\frac{1}{s}$ | $\mathrm{Re}\, s > 0$ |
| $\rho(t)$ | $\frac{1}{s^2}$ | $\mathrm{Re}\, s > 0$ |
| $t^k\, \sigma(t)$ | $\frac{k!}{s^{k+1}}$ | $\mathrm{Re}\, s > 0$ , k ganz |
| $e^{qt}\, \sigma(t)$ | $\frac{1}{s - q}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q$ |
| $t\, e^{qt}\, \sigma(t)$ | $\frac{1}{(s - q)^2}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q$ |
| $t^k\, e^{qt}\, \sigma(t)$ | $\frac{k!}{(s - q)^{k+1}}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q$ , k ganz |
| $\cos(\omega_1 t)\, \sigma(t)$ | $\frac{s}{s^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $\sin(\omega_1 t)\, \sigma(t)$ | $\frac{\omega_1}{s^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $\cos(\omega_1 t - p)\, \sigma(t)$ | $\frac{s \cos p - \omega_1 \sin p}{s^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $t \cos(\omega_1 t)\, \sigma(t)$ | $\frac{s^2 - \omega_1^2}{(s^2 + \omega_1^2)^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $t \sin(\omega_1 t)\, \sigma(t)$ | $\frac{2\omega_1 s}{(s^2 + \omega_1^2)^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $e^{qt} \cos(\omega_1 t)\, \sigma(t)$ | $\frac{s + \omega_1}{(s - q)^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q + \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $e^{qt} \sin(\omega_1 t)\, \sigma(t)$ | $\frac{\omega_1}{(s - q)^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q + \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $e^{qt} \cos(\omega_1 t - p)\, \sigma(t)$ | $\frac{(s - q) \cos p - \omega_1 \sin p}{(s - q)^2 + \omega_1^2}$ | $\mathrm{Re}\, s > \mathrm{Re}\, q + \lvert \mathrm{Im}\, \omega_1 \rvert$ |
| $\cosh(qt)\, \sigma(t)$ | $\frac{s}{s^2 - q^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Re}\, q \rvert$ |
| $\sinh(qt)\, \sigma(t)$ | $\frac{-q}{s^2 - q^2}$ | $\mathrm{Re}\, s > \lvert \mathrm{Re}\, q \rvert$ |
| $(1 - e^{qt})\, \sigma(t)$ | $\frac{1}{s} \frac{q}{s - q}$ | $\mathrm{Re}\, s > \max\, \{0, \mathrm{Re}\, q\}$ |
| $\mathrm{rect}\left(\frac{t}{T} - \frac{1}{2}\right)$ | $\frac{1 - e^{-sT}}{s}$ | $T > 0$ |
| $\mathrm{tri}\left(\frac{t}{T} - 1\right)$ | $\frac{1}{T} \left(\frac{1 - e^{-sT}}{s}\right)^2$ | $T > 0$ |