Grenzwerte

Summe: $\lim(\Phi_n \pm \Psi_n) = \Phi \pm \Psi = \lim \Phi_n \pm \lim \Psi_n$ (G-1)

Product: $\lim(\Phi_n \cdot \Psi_n) = \Phi \cdot \Psi = \lim \Phi_n \cdot \lim \Psi_n$ (G-2)

Quotient: $\lim\left(\frac{\Phi_n}{\Psi_n}\right) = \frac{\Phi}{\Psi} = \frac{\lim \Phi_n}{\lim \Psi_n}$ (G-3)

$\lim c \cdot \Phi_n = c \cdot \lim \Phi_n$ (G-4)

$\lim \log_b \Phi_n = \log_b \lim \Phi_n$ (G-5)

$\lim \Phi_n^{\Psi_n} = \lim \Phi_n^{\;\lim \Psi_n}$ (G-6)

Wenn: $\lim \frac{\Phi_n}{\lim \Psi_n} = a$ So: $\lim \frac{\Psi_n}{\Phi_n} = \frac{1}{a}$ (G-7)

Allgemein:

$y = f(\varphi(x))$ | $y = f(z), z = \varphi(x)$

$\lim\limits_{x=x_1} \varphi(x) = \varphi(x_1) = z_1$ wenn $\varphi(x)$ an Stelle $x = x_1$ stetig (G-8)

$\lim\limits_{z=z_1} f(z) = f(z_1)$ wenn $f(z)$ an der Stelle $z = z_1$ stetig

$= f\left(\lim\limits_{x=x_1} \varphi(x)\right)$ (G-9)

$\lim\limits_{x=x_1} f(\varphi(x)) = f\left(\lim\limits_{x=x_1} \varphi(x)\right)$ der lim. einer Function = Function des lim (G-10)

Bestimmung

$$\lim_{x=\pm\infty}\left(1+\frac{1}{x}\right)^x = e \quad \text{(G-11)}$$

$$\lim_{x=\pm\infty}\left(1+\frac{a}{x}\right)^x = e^a \qquad \lim_{x\to 0}\frac{x}{\ln(1+x)} = 1 \quad \text{(G-12)}$$

$$\lim_{x=0}(1+ax)^{1/x}=e^{a} \qquad \lim_{x=0}\frac{b^{x}-1}{x}=\ln b \qquad \text{(G-13)}$$

$$\lim_{x=0}\frac{\log_{b}(1+ax)}{x}=\frac{a}{\ln b} \qquad \lim_{x=0}\frac{e^{x}-1}{x}=1 \qquad \text{(G-13)}$$

$$\lim_{x=0}\frac{\log_{b}(1+x)}{x}=\frac{1}{\ln b} \qquad \lim_{x=0}\frac{x}{e^{x}-1}=1 \qquad \text{(G-14)}$$

$$\lim_{x=0}\frac{x}{\log_{b}(1+x)}=\ln b \qquad \lim_{x=0}\frac{(1+x)^{m}-1}{x}=m \qquad \text{(G-15)}$$

$$\lim_{x=0}\frac{\ln(1+x)}{x}=1 \qquad \lim_{n=\infty}\frac{k^{n}}{n!}=0 \qquad \text{(G-16)}$$

Grenzwerte

$$\lim_{x=0}\frac{\sin x}{x}=1 \qquad \lim_{\delta=0}\frac{(1+\delta)^{\mu}-1}{\delta}=\mu \qquad \text{(G-17)}$$

$$\lim_{x=0}\frac{\operatorname{tg} x}{x}=1 \qquad \text{(G-18)}$$