Blatt 2

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5

$$\lim_{h\to 0}\frac{f(x_0+hr)-f(x_0)}{h}=$$

$$\lim_{h\to 0}\frac{4\cos\left(\frac{\pi}{4}+h\sqrt{14}\right)\arctan\left((1+h)e^{-(0+h)^2}\right)-4\cos\left(\frac{\pi}{4}\right)\arctan\left(1e^{-0^2}\right)}{h}=$$

$$\lim_{h\to 0}\frac{4\cos\left(\frac{\pi}{4}+h\sqrt{14}\right)\arctan\left((1+h)e^{-h^2}\right)-4\frac{1}{\sqrt{2}}\frac{\pi}{4}}{h}\overset{\text{Regel von de l'Hospital}}{=}$$

$$\lim_{h\to 0}\frac{-4\sin\left(\frac{\pi}{4}+h\sqrt{14}\right)\sqrt{14}\arctan\left((1+h)e^{-h^2}\right)+4\cos\left(\frac{\pi}{4}+h\sqrt{14}\right)\frac{e^{h^2}(1-2h-2h^2)}{e^{2h^2}+(1+h)^2}}{1}$$

$$-4\frac{1}{\sqrt{2}}\sqrt{14}\frac{\pi}{4}+4\frac{1}{\sqrt{2}}\frac{1}{2}=-\sqrt{7}\pi+\sqrt{2}$$