

Wilfried Grieger's Theorem

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Behauptung: $\cos(x)=1 \quad \forall x \in \mathbb{R}$

Beweis:

$\forall x \in \mathbb{R}:$

$$\begin{aligned}\cos(x) + i \sin(x) &= e^{ix} && \text{Eulersche Formel} \\ &= e^{\frac{x}{2\pi} 2\pi i} \\ &= \left(e^{2\pi i} \right)^{\frac{x}{2\pi}} \\ &= \left(1 \right)^{\frac{x}{2\pi}} = 1 \quad \Rightarrow\end{aligned}$$

$$1 = \Re 1 = \Re (\cos(x) + i \sin(x)) = \cos(x)$$

q. e. d.