

International University Bremen
School of Engineering and Science
Götz Pfander, Sergei Markouski, Alex Sava

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Name:

Analysis I — Quiz 4
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Q4.1. Determine $\liminf_{n \rightarrow \infty} a_n$ and $\limsup_{n \rightarrow \infty} a_n$, where $a_n = \sqrt[n]{1 + 2^{n(-1)^n}}$.

Q4.2. Let $\{a_n\}$ be a positive bounded sequence with $\{\frac{1}{a_n}\}$ bounded. Prove that if

$$\limsup_{n \rightarrow \infty} a_n \cdot \limsup_{n \rightarrow \infty} \frac{1}{a_n} = 1,$$

then the sequence $\{a_n\}$ is convergent.