

Fast Quiz #2

Numerical Functional Analysis, 5.0 hp

Præparatus supervivet

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1. **True/False:** In a normed vector space $(X, \|\cdot\|)$, the map $x : X \rightarrow \mathbf{R}$ defined by $x \mapsto \sqrt{1 + \|x\|^2}$ is continuous.
2. **True/False:** When considered on \mathbf{R}^n , the norms $\|\cdot\|_\infty$ and $\|\cdot\|_1$ imply the same topology, but they are not equivalent.
3. **True/False:** All subspaces of the (sequence-) l^2 -space are complete.
4. **True/False:** Define $f_z(x) = \|x - z\|$ for arguments x in some normed vector space X . Then there is a solution to $x = \arg \max_{x \in M} f_z(x)$ for any compact subset $M \subseteq X$.
5. **True/False:** All linear operators on $C[0, 1]$ are continuous.
6. **True/False:** If there is a Schauder basis, then the space is separable.
7. **True/False:** $L^2[0, 1]$ is separable.
8. **True/False:** The convergence of a Schauder expansion is always in the absolute sense.
9. **True/False:** If the space is separable, then there is a Schauder basis.
10. **True/False:** A closed and bounded subset of a metric space is compact.