

Fast Quiz #2

Numerical Functional Analysis

Præparatus supervivet

Stefan Engblom

Division of Scientific Computing
Department of Information Technology
Uppsala University

Uppsala, May, 2019

Question 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.

Question 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.

Question 3

True/False: All subspaces of the (sequence-) l^2 -space are complete.

Question 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 $M \subseteq X$.

Question 5

True/False: All linear operators on $C[0, 1]$ are continuous.

Question 6

True/False: If there is a Schauder basis, then the space is separable.

Question 7

True/False: $L^2[0, 1]$ is separable.

Question 8

True/False: The convergence of a Schauder expansion is always in the absolute sense.

Question 9

True/False: If the space is separable, then there is a Schauder basis.

Question 10

True/False: A closed and bounded subset of a metric space is compact.