

Fast Quiz #1

Numerical Functional Analysis

Præparatus supervivet

Stefan Engblom

Division of Scientific Computing
Department of Information Technology
Uppsala University

Uppsala, February 2022

Question 1

True/False: $d(x, y) = |x - y|^2$ is a metric on \mathbf{R} .

Question 2

True/False: Suppose X is some space. Then for $x, y \in X$, $d(x, y) = 0$ when $x = y$ and $= 1$ otherwise defines a metric.

Question 3

True/False: The *distance metric* between any two subsets A and B of a metric space (X, d) is given by

$$D(A, B) = \inf_{a \in A, b \in B} d(a, b).$$

Question 4

True/False: Sets can be both open and closed at the same time.

Question 5

True/False: $d(x, y) = |x - y|^{1/2}$ is a metric on \mathbf{R} .

Question 6

True/False: A sequence $(x_n) \in X$ in a metric space which converges has to be bounded.

Question 7

True/False: The subset of polynomials in the metric space $C[a, b]$ is closed.

Question 8

True/False: The set $[-1, 1] \setminus \{0\}$ is an incomplete subspace of \mathbf{R} .