Problem 0. Describe a finite model of extensionality, set existence and union that has a set with at least three elements (i.e., \((\exists v, x, y, z)(v \in z \land x \in z \land y \in z \land x \neq v \land x \neq y \land v \neq y))\).

Problem 1. Prove that there is no finite model of comprehension, extensionality, set existence and pairing.

Problem 2. Explicitly define a bijection between the closed unit ball and the open unit ball in \(\mathbb{R}^n\).

Problem 3. Suppose that \(R\) is a well-order (i.e., a well-founded strict total order) of a set \(A\). Define a strict total order \(S\) on \(\mathcal{P}(A)\) such that \(\{x\}S\{y\}\) if and only if \(xRy\) for all \(x, y \in A\).