集合部分

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1.有限集　若势相同　则满足单射he满射中的任意一个 即为双射

- Prove that "for a function $f : A \to B$ with $|A| = |B| = n$, f is one-to-one if and only if f is onto."

Proof.

◇ only if part: Suppose that f is one-to-one. Let $\{x_1, x_2, \ldots, x_n\}$ be elements of A. Then $f(x_i) \neq f(x_j)$ for $i \neq j$. Therefore, $|f(A)| = |\{f(x_1), \ldots, f(x_n)\}| = n$. But $|B| = n$ and $f(A) \subseteq B$. Therefore, $f(A) = B$.

◇ if part: Suppose that f is onto. Let $A = \{x_1, x_2, \ldots, x_n\}$ be a listing of the elements of A. Suppose that $f(x_i) = f(x_j)$ for some $i \neq j$. Then, $|\{f(x_1), \ldots, f(x_n)\}| \leq n - 1$. But $|f(A)| = |B| = n$, a contradiction.

2.可数集合的子集必定可数

找到方式列举即可，在子集内就列举，否则就跳过

3.证明可数：　1.找到列举方式　2.找到f：Z+ -> A的双射

正偶数集合　　f : x 7→ 2x −2 is bijection

Z　可数　　0 1 -1 2 -2....

Q　可数　　p/q　对角线法则

R 不可数　　反证 0.d11d12d13.....　0.d21d22d23.....